FIG. 1

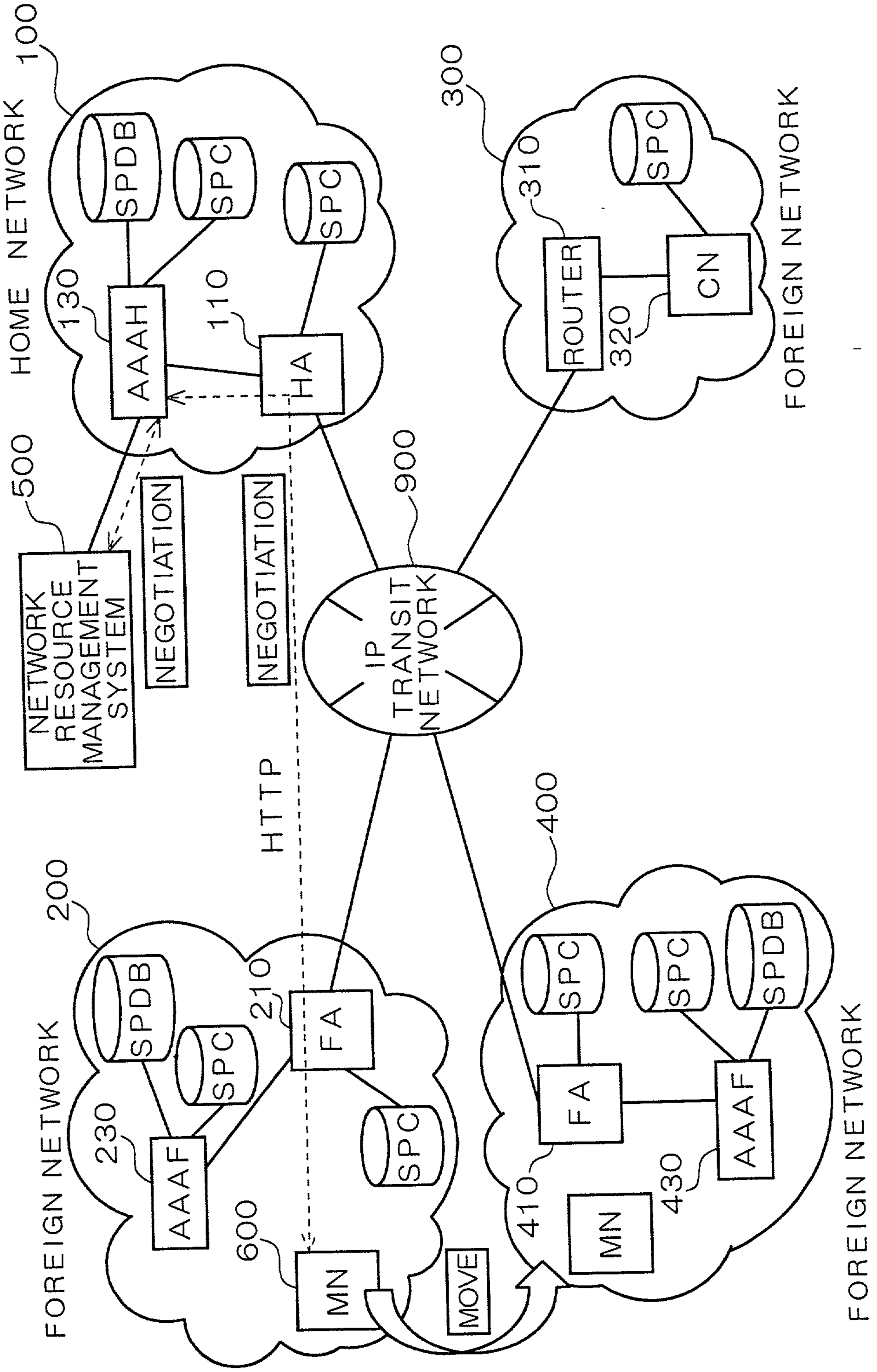
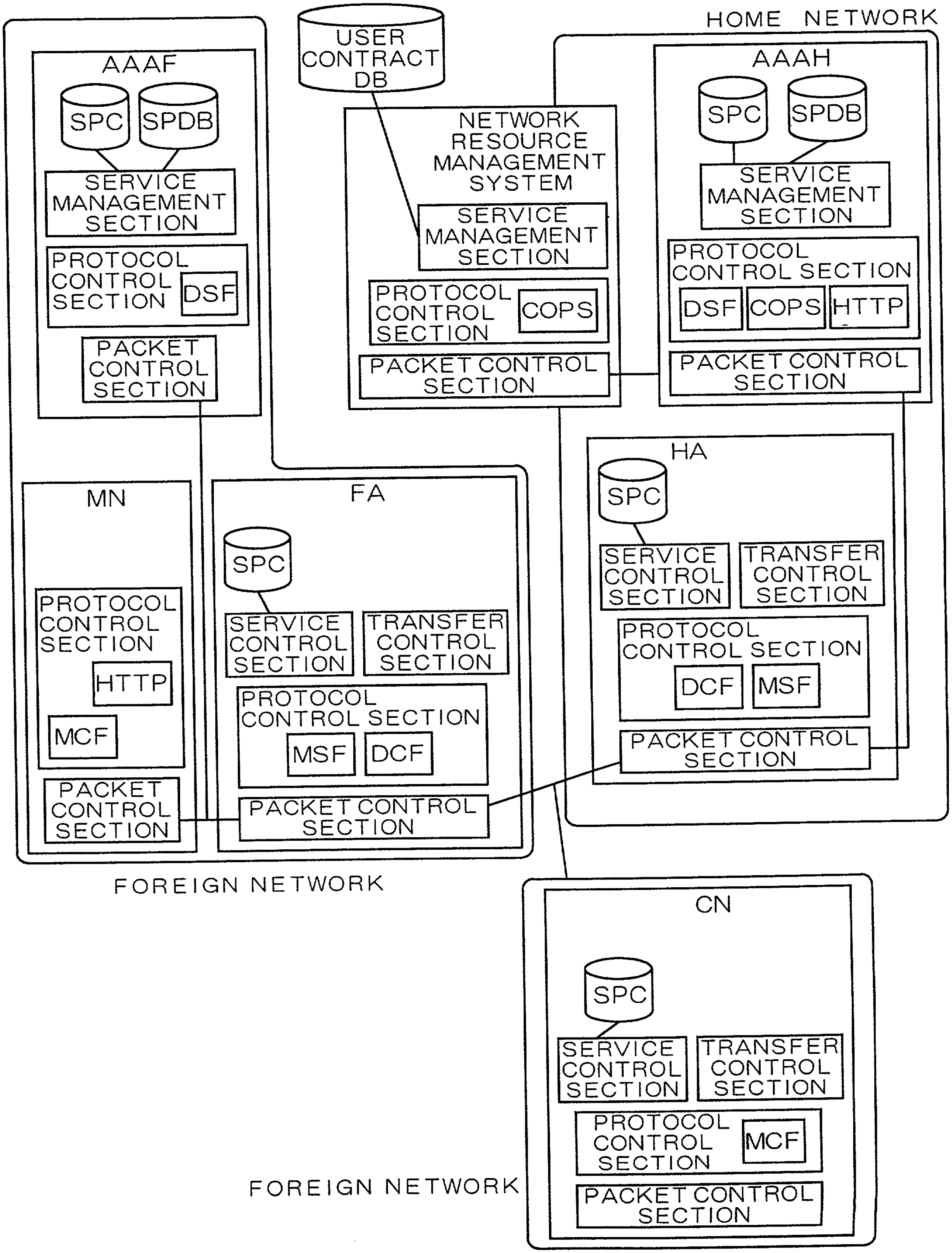

HOME NETWORK
100
SPDB
SPC
SPC
130
AAAH
110
HA
500
NETWORK RESOURCE MANAGEMENT SYSTEM
NEGOTIATION
NEGOTIATION
HTTP
900
IP TRANSIT NETWORK
300
310
ROUTER
320
CN
SPC
FOREIGN NETWORK
200
FOREIGN NETWORK
SPDB
SPC
210
FA
SPC
230
AAAF
600
MN
MOVE
400
SPC
SPC
SPDB
FA
AAAF
410
430
MN
FOREIGN NETWORK

FIG. 2


HOME NETWORK
AAAF
SPC
SPDB
SERVICE MANAGEMENT SECTION
PROTOCOL CONTROL SECTION
DSF
PACKET CONTROL SECTION
USER CONTRACT DB
NETWORK RESOURCE MANAGEMENT SYSTEM
SERVICE MANAGEMENT SECTION
PROTOCOL CONTROL SECTION
COPS
PACKET CONTROL SECTION
AAAH
SPC
SPDB
SERVICE MANAGEMENT SECTION
PROTOCOL CONTROL SECTION
DSF
COPS
HTTP
PACKET CONTROL SECTION
MN
PROTOCOL CONTROL SECTION
HTTP
MCF
PACKET CONTROL SECTION
FA
SPC
SERVICE CONTROL SECTION
TRANSFER CONTROL SECTION
PROTOCOL CONTROL SECTION
MSF
DCF
PACKET CONTROL SECTION
HA
SPC
SERVICE CONTROL SECTION
TRANSFER CONTROL SECTION
PROTOCOL CONTROL SECTION
DCF
MSF
PACKET CONTROL SECTION
FOREIGN NETWORK
CN
SPC
SERVICE CONTROL SECTION
TRANSFER CONTROL SECTION
PROTOCOL CONTROL SECTION
MCF
PACKET CONTROL SECTION
FOREIGN NETWORK

F/G. 3

MESSAGE TYPE	MESSAGE TRANS-FERING NODE	NODE WHICH RECEIVES MESSAGE AND MESSAGE TO BETRANSFERED AFTER RECEIVING MESSAGE (MESSAGE TO BE TRANSFERED AFTER RECEIVING MESSAGE /DESTINATION NODE)					
		MN	CN	HA	FA	AAAF	AAAH
MIP REGISTRATION REQUEST	MN	—	—		MIP REGISTRATION REQUEST / HA	—	—
	MN	—	—		AMR/ AAAF	—	—
	FA	—	—	MIP REGISTRATION REPLY/FA	—	—	—
MIP REGISTRATION REPLY	FA	TERMINAL	—	—	—	—	—
	HA	—	—	—	—	—	—
MIP BINDING UPDATE	HA	—	MIP BINDING ACKNOWLEDGE /HA	—	—	—	—
MIP BINDING ACKNOWLEDGE	CN	—	—	MIP BINDING UPDATE/CN	—	—	—
	CN			HAA/ AAAH	—	—	—
AMR	FA	—	—	—	—	AMR/ AAAH	—
	AAAF	—	—	—	—	—	HAR/ HA

F/G. 4

MESSAGE TYPE	MESSAGE TRANS–FERING NODE	NODE WHICH RECEIVES MESSAGE AND MESSAGE TO BE TRANSFERED AFTER RECEIVING MESSAGE (MESSAGE TO BE TRANSFERED AFTER RECEIVING MESSAGE /DESTINATION NODE)					
		MN	CN	HA	FA	AAAF	AAAH
AMA	FA	–	–	–	MIP REGISTRATION REPLY/MN	–	–
	AAAF	–	–	–	–	AMA/ FA	–
HAR	AAAH	–	–	MIP BINDING UPDATE/CN	–	–	–
	AAAH			HAA/ AAAH	–	–	–
HAA	HA	–	–	–	–	–	AMR/ AAAF
SCR	AAAH	–	–	SCA/ AAAH	–	–	–
	AAAF	–	–	–	SCA/ AAAF	–	–
	FA	–	–	–	–	SCR/ FA	–
SCA	FA	–	–	–	–	SCA/ AAAH	–
	AAAF	–	–	–	–	TERMINAL	
	HA	–	–	–	–		SCR/ AAAF
ROUTER ADVERTISE–MENT	FA	MIP REGISTRATION REQUEST / FA	–	–	–	–	–

FIG. 5

IP HEADER
UDP HEADER
Mobile－IP FIELD

FIG. 6

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
```

<table>
<tr><td colspan="4">Ver=4</td><td colspan="4">IHL</td><td colspan="8">TOS</td><td colspan="16">Packet Length</td></tr>
<tr><td colspan="16">Identifier</td><td colspan="3">flag</td><td colspan="13">flagment offset</td></tr>
<tr><td colspan="8">TTL</td><td colspan="8">Next prot=UDP</td><td colspan="16">checksum</td></tr>
<tr><td colspan="32">Source Address</td></tr>
<tr><td colspan="32">Destination Address</td></tr>
</table>

FIG. 7

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
```

Source Port = 434	Destination Port = 434
Length	checksum

FIG. 8

0 1 2 3
01234567890123456789012345678901

TYPE=1	S	B	D	M	G	V	P	r	LIFE TIME
HOME ADDRESS									
HA ADDRESS									
CARE-OF-ADDRESS									
MESSAGE IDENTIFIER									
MN-HA AUTHENTICATION EXTENSION									
MN-AAA AUTHENTICATION EXTENSION									
MN-NAI EXTENSION									
MN-SPC EXTENSION									

FIG. 9

0 1 2 3
01234567890123456789012345678901

EXTENSION TYPE=140	LENGTH	
Vendor/Org. ID=211		
SEQUENCE NUMBER		C
DATA FIELD		

FIG. 10


0 1 2 3
0123456789012345678901234567890 1
TYPE=3
CODE
LIFE TIME
HOME ADDRESS
HA ADDRESS
MESSAGE IDENTIFIER
MN SERVICE PROFILE EXTENSION

FIG. 11

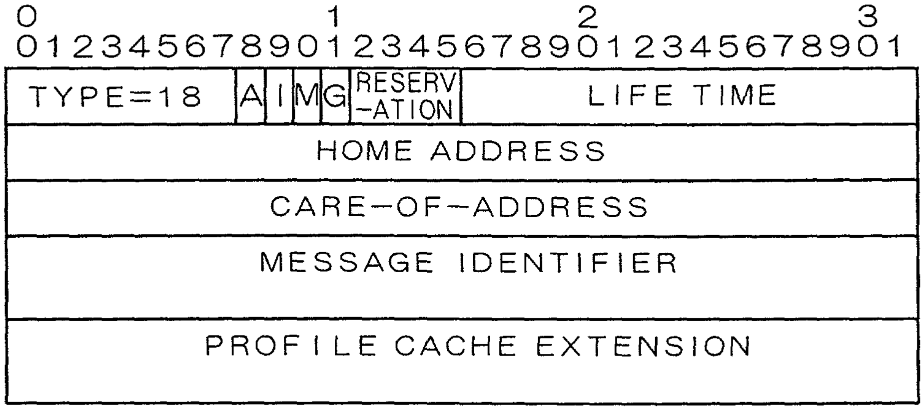

0 1 2 3
0123456789012345678901234567890 1
TYPE=18
A
I
M
G
RESERV-ATION
LIFE TIME
HOME ADDRESS
CARE-OF-ADDRESS
MESSAGE IDENTIFIER
PROFILE CACHE EXTENSION

FIG. 12

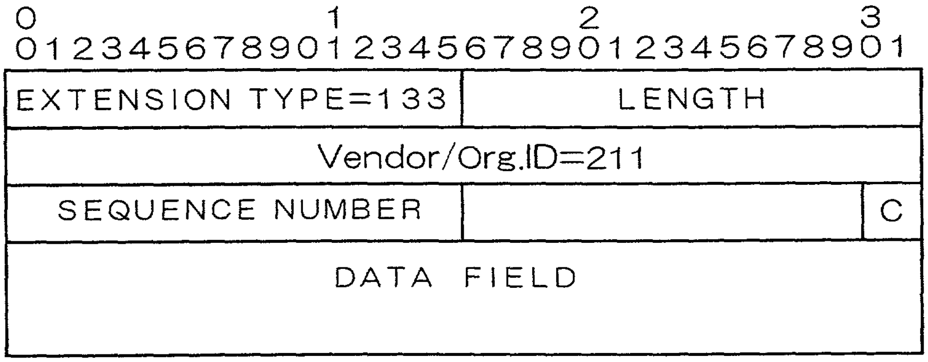


FIG. 13

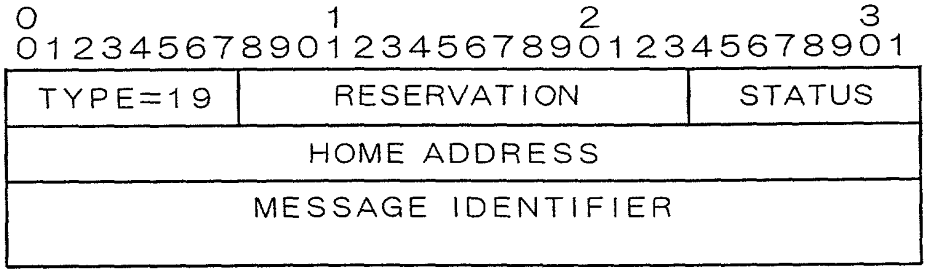


FIG. 14

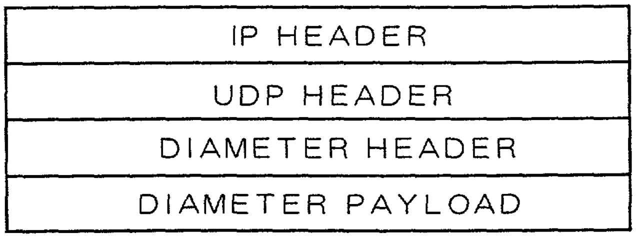


FIG. 15

```
0         1         2         3
01234567890123456789012345678901
```

Source Port = RADIUS	Destination Port = RADIUS
Length	checksum

FIG. 16

```
0         1         2         3
01234567890123456789012345678901
```

RADIUS PCC	Flags	A	W	Ver	Packet Length
Identifier					
Next Send (Ns)					Next Received (Nr)
AVPs					

FIG. 17

<DIAMETER Header>
<AA-Mobile-Node-Request Command AVP>
<Session ID AVP >
<User-Name AVP>
<MIP-Registration-Request AVP>
<MN-FA-Challenge AVP>
<MN-FA-Response AVP>
<Mobile-Node-Address AVP>
<Home-Agent-Address AVP>
[<Previous-FA-NAI AVP>]
[<MN-FA-SPI AVP>]
[<MN-SPC AVP>]
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

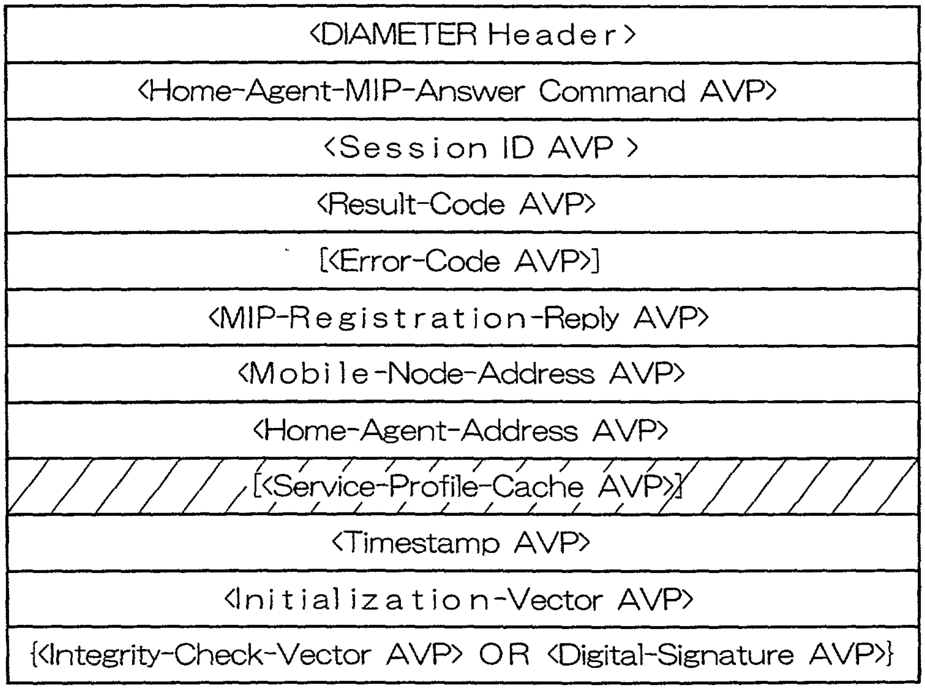
FIG. 18

<DIAMETER Header>
<Home-Agent-MIP-Request Command AVP>
<Session ID AVP >
<User-Name AVP>
<MIP-Registration-Request AVP>
<MN-HA-SPI AVP>
<HA-to-MN-Key AVP>
<MN-to-HA-Key AVP>
<FA-HA-SPI AVP>
<HA-to-FA-Key AVP>
<MN-FA-SPI AVP>
<MN-to-FA-Key AVP>
<Home-Agent-Address AVP>
<Mobile-Node-Address AVP>
[<Service-Profile-Cache AVP>]
<Session-Timeout AVP>
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

FIG. 19

<DIAMETER Header>
<AA-Mobile-Node-Answer Command AVP>
<Session ID AVP >
<Result-Code AVP>
[<Error-Code AVP>]
<MIP-Registration-Reply AVP>
<MN-FA-SPI AVP>
<FA-to-MN-Key AVP>
<FA-HA-SPI AVP>
<FA-to-HA-Key AVP>
<Home-Agent-Address AVP>
<Mobile-Node-Address AVP>
[<Service-Profile-Cache AVP>]
<Session-Timeout AVP>
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

FIG. 20



<DIAMETER Header>
<Home-Agent-MIP-Answer Command AVP>
<Session ID AVP >
<Result-Code AVP>
[<Error-Code AVP>]
<MIP-Registration-Reply AVP>
<Mobile-Node-Address AVP>
<Home-Agent-Address AVP>
[<Service-Profile-Cache AVP>]
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

FIG. 21

<DIAMETER Header>
<Service-Change-Request Command AVP>
<Session ID AVP >
<Previous-FA-NAI AVP>
<Service-Profile-Cache AVP>
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

FIG. 22

<DIAMETER Header>
<Service-Change-Request Command AVP>
<Session ID AVP >
<Result-Code AVP>
[<Error-Code AVP>]
<Timestamp AVP>
<Initialization-Vector AVP>
{<Integrity-Check-Vector AVP> OR <Digital-Signature AVP>}

FIG. 23

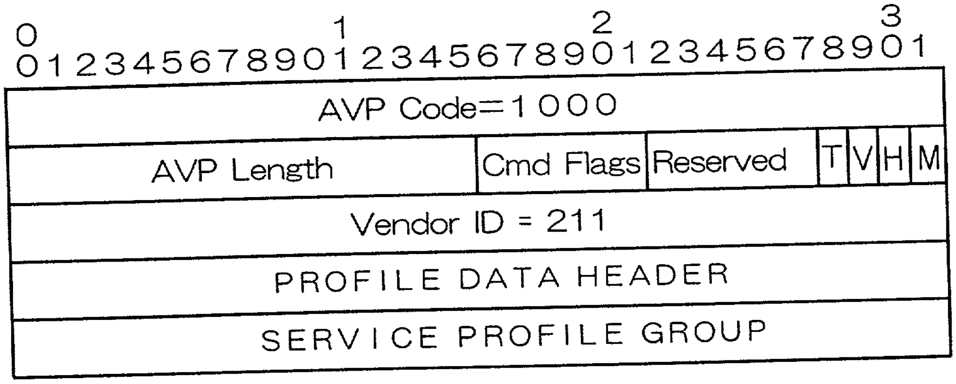

0
1
2
3
01234567890123456789012345678901
AVP Code=1000
AVP Length
Cmd Flags
Reserved
T
V
H
M
Vendor ID = 211
PROFILE DATA HEADER
SERVICE PROFILE GROUP

FIG. 24

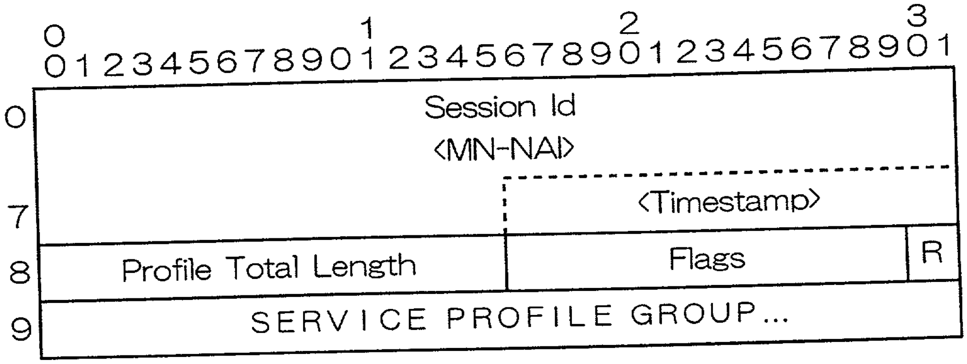

0
1
2
3
01234567890123456789012345678901
0
7
8
9
Session Id
<MN-NAI>
<Timestamp>
Profile Total Length
Flags
R
SERVICE PROFILE GROUP...

FIG. 25

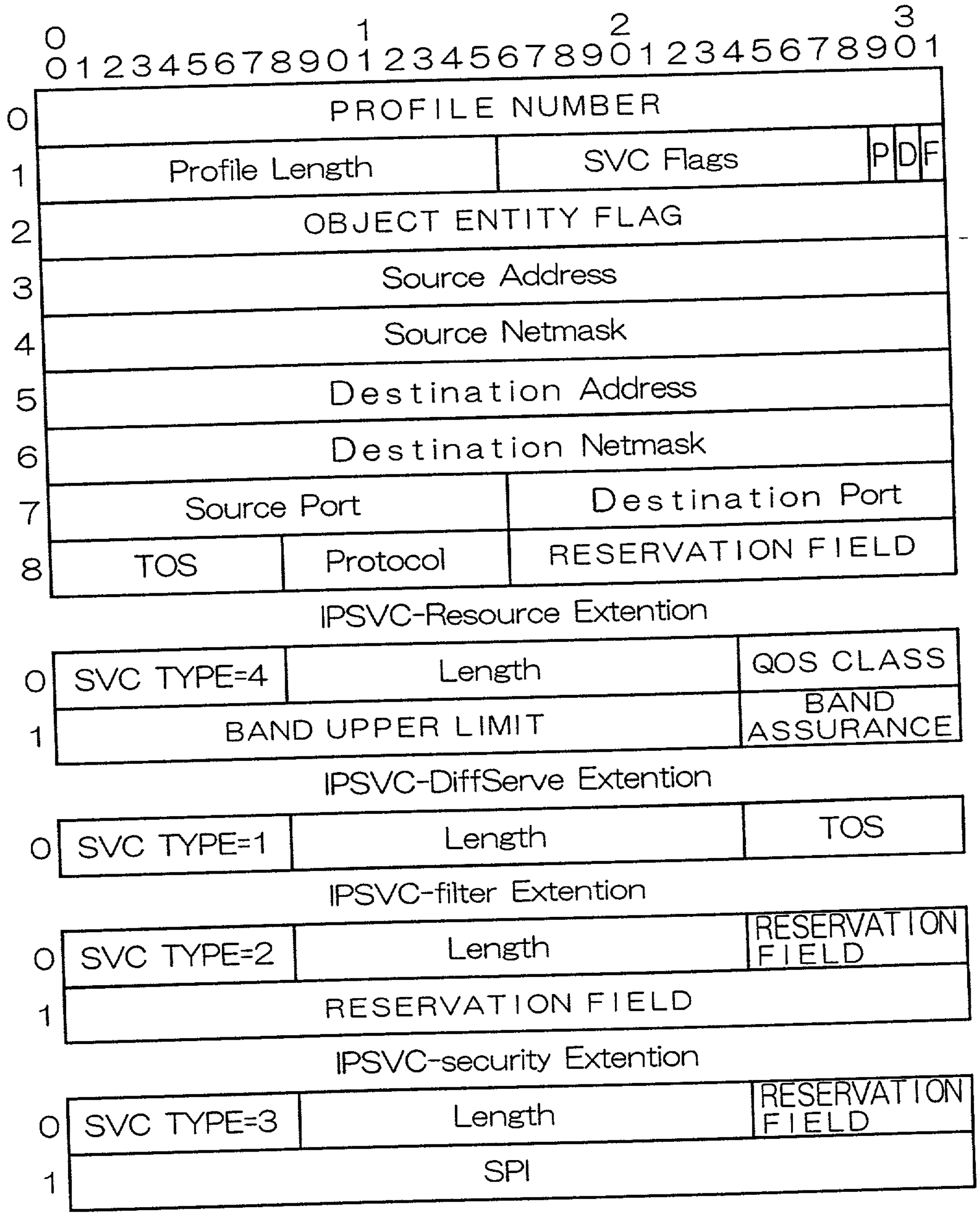

0 1 2 3
01234567890123456789012345678901
0 PROFILE NUMBER
1 Profile Length
SVC Flags
P
D
F
2 OBJECT ENTITY FLAG
3 Source Address
4 Source Netmask
5 Destination Address
6 Destination Netmask
7 Source Port
Destination Port
8 TOS
Protocol
RESERVATION FIELD
IPSVC-Resource Extention
0 SVC TYPE=4
Length
QOS CLASS
1 BAND UPPER LIMIT
BAND ASSURANCE
IPSVC-DiffServe Extention
0 SVC TYPE=1
Length
TOS
IPSVC-filter Extention
0 SVC TYPE=2
Length
RESERVATION FIELD
1 RESERVATION FIELD
IPSVC-security Extention
0 SVC TYPE=3
Length
RESERVATION FIELD
1 SPI

FIG. 26

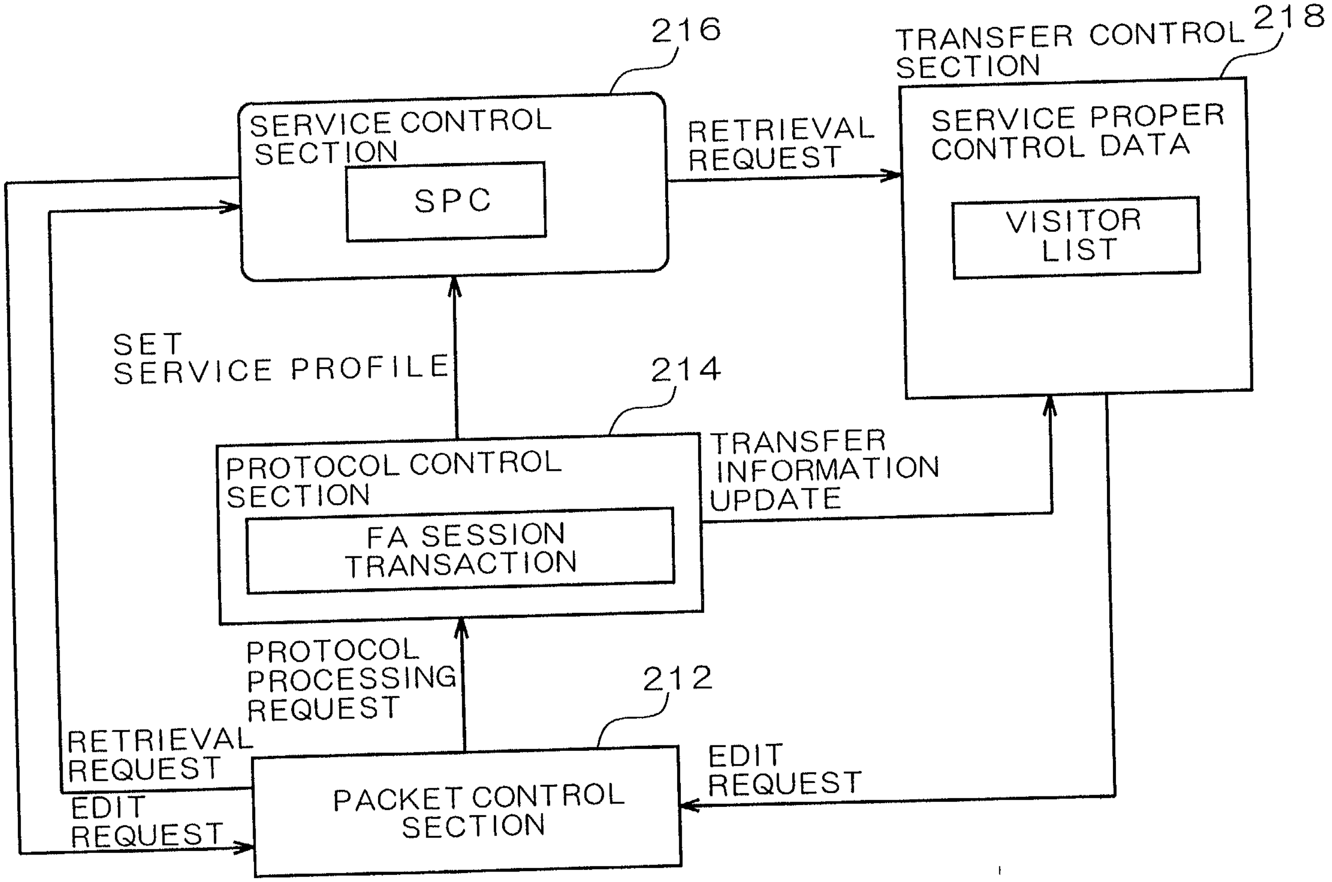

216
SERVICE CONTROL SECTION
SPC
218
TRANSFER CONTROL SECTION
SERVICE PROPER CONTROL DATA
VISITOR LIST
RETRIEVAL REQUEST
SET SERVICE PROFILE
214
PROTOCOL CONTROL SECTION
FA SESSION TRANSACTION
TRANSFER INFORMATION UPDATE
PROTOCOL PROCESSING REQUEST
212
PACKET CONTROL SECTION
RETRIEVAL REQUEST
EDIT REQUEST
EDIT REQUEST

FIG. 27

STRUCTURAL ELEMENT	EXPLANATION
SESSION ID	<NAI OF MN><32 BIT VALUE><OPTION>
SESSION TIMER	TERM OF VALIDITY FOR THIS TRANSACTION

FIG. 28

STRUCTUAL ELEMENT	VALUE	EXPLANATION
PROFILE NUMBER	1	
OBJECT ENTITY	01000000	FROM LEFT, FIRST BIT IS HA, SECOND BIT IS FA, THIRD BIT IS CN. ONLY FA IS OBJECT HERE.
SOURCE IP ADDRESS	10.10.10.1	SOURCE IP ADDRESS OF USER PACKET TO BE SERVICE OBJECT. ADDRESS OF CN IS INDICATED HERE.
SOURCE NET MASK	255.255.255.0	NET MASK FOR SOURCE IP ADDRESS
DESTINATION ADDRESS	10.10.20.1	DESTINATION IP ADDRESS OF USER PACKET TO BE SERVICE OBJECT. ADDRESS OF MN IS INDICATED HERE.
DESTINATION NET MASK	255.255.255.0	NET MASK FOR DESTINATION IP ADDRESS
SOURCE PORT NUMBER	0	SOURCE PORT NUMBER OF USER PACKET TO BE SERVICE OBJECT. NOTHING IS SPECIFIED HERE.
DESTINATION PORT NUMBER	0	DESTINATION PORT NUMBER OF USER PACKET TO BE SERVICE OBJECT. NOTHING IS SPECIFIED HERE.
BAND CONTROL EXTENSION INFORMATION		
SERVICE TYPE	4	BAND CONTROL
QOS CLASS	2	QoS CLASS BEING USED
BAND UPPER LIMIT	255	UPPER LIMIT OF AVAILABLE BAND
BAND ASSURANCE	0	OFF

F/G. 29

STRUCTURAL ELEMENT	EXPLANATION
IP SOURCE ADDRESS	HOME ADDRESS OF MN THAT IS NOTIFIED WITH REGISTRATION REQUEST OR AMA
LINK LAYER SOURCE ADDRESS	ADDRESS OF MN LINK LAYER (MAC)
UDP SOURCE PORT	UDP SOURCE PORT NUMBER OF MN
HA ADDRESS	ADDRESS OF HA FOR FORWARDING REGISTRATION REQUEST, NOTIFIED WITH REGISTRATION REQUEST OR AMA
REGISTRATION REQUEST IDENTIFIER FIELD	IDENTIFIER FOR ASSOCIATING REQUEST WITH RESPONSE
LIFE TIME	TERM OF VALIDITY FOR REGISTRATION REQUEST
AUTHENTICATION INFORMATION	AUTHENTICATION INFORMATION FOR FA AUTHENTICATE MN

FIG. 30

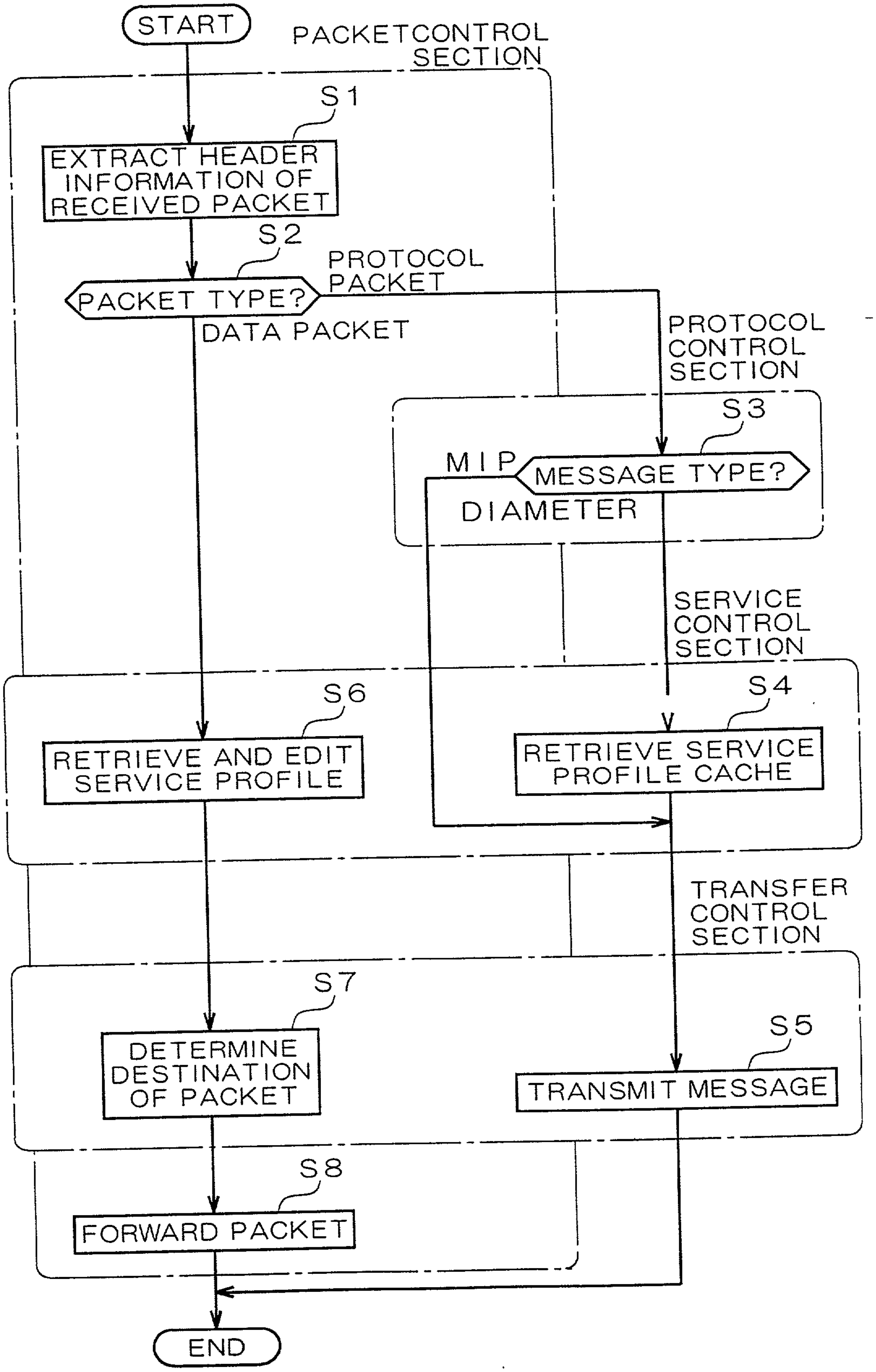

START
PACKETCONTROL SECTION
S1
EXTRACT HEADER INFORMATION OF RECEIVED PACKET
S2
PROTOCOL PACKET
PACKET TYPE?
DATA PACKET
PROTOCOL CONTROL SECTION
S3
MIP
MESSAGE TYPE?
DIAMETER
SERVICE CONTROL SECTION
S6
RETRIEVE AND EDIT SERVICE PROFILE
S4
RETRIEVE SERVICE PROFILE CACHE
TRANSFER CONTROL SECTION
S7
DETERMINE DESTINATION OF PACKET
S5
TRANSMIT MESSAGE
S8
FORWARD PACKET
END

FIG. 31

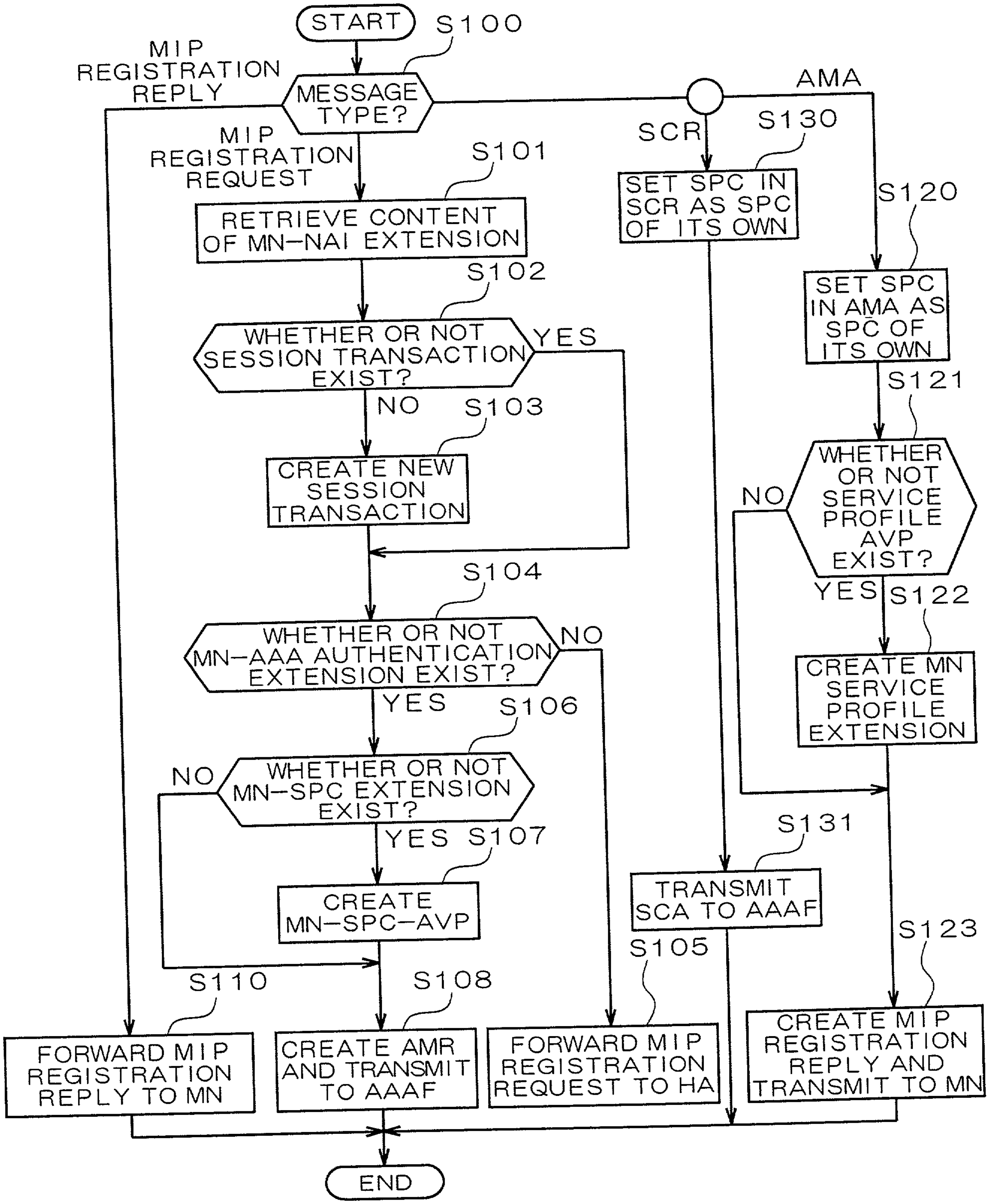

START
S100
MESSAGE TYPE?
MIP REGISTRATION REPLY
MIP REGISTRATION REQUEST
SCR
AMA
S101
RETRIEVE CONTENT OF MN-NAI EXTENSION
S102
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S103
CREATE NEW SESSION TRANSACTION
S104
WHETHER OR NOT MN-AAA AUTHENTICATION EXTENSION EXIST?
NO
YES
S106
WHETHER OR NOT MN-SPC EXTENSION EXIST?
NO
YES
S107
CREATE MN-SPC-AVP
S110
FORWARD MIP REGISTRATION REPLY TO MN
S108
CREATE AMR AND TRANSMIT TO AAAF
S105
FORWARD MIP REGISTRATION REQUEST TO HA
S130
SET SPC IN SCR AS SPC OF ITS OWN
S131
TRANSMIT SCA TO AAAF
S120
SET SPC IN AMA AS SPC OF ITS OWN
S121
WHETHER OR NOT SERVICE PROFILE AVP EXIST?
NO
YES
S122
CREATE MN SERVICE PROFILE EXTENSION
S123
CREATE MIP REGISTRATION REPLY AND TRANSMIT TO MN
END

FIG. 32

STRUCTURAL ELEMENT	EXPLANATION
HOME ADDRESS	HOME ADDRESS ASSIGNED TO MN
CARE-OF-ADDRESS OF MOBILE TERMINAL EQUIPMENT	IP ADDRESS OF FA TO WHICH MN CURRENTLY CONNECTED
REGISTRATION REQUEST IDENTIFIER FIELD	IDENTIFIER FOR ASSOCIATING REQUEST WITH RESPONSE
LIFE TIME	TERM OF VALIDITY FOR REGISTRATION REQUEST
AUTHENTICATION INFORMATION	AUTHENTICATION INFORMATION FOR HA AUTHENTICATE MN

FIG. 33

STRUCTURAL ELEMENT	EXPLANATION
CN ADDRESS	CN ADDRESS TO WHICH MIP BINDING UPDATE MESSAGE HAS BEEN TRANSMITTED
LIFE TIME	TERM OF VALIDITY FOR AGING PROCESS
MESSAGE IDENTIFIER	MESSAGE IDENTIFIER WITH WHICH UPDATE BINDING HAS BEEN BROUGHT ABOUT

F/G. 34

STRUCTURAL ELEMENT	EXPLANATION
SESSION ID	<NAI OF MN><32 BIT VALUE><OPTION>
SESSION TIMER	TERM OF VALIDITY FOR THIS TRANSACTION
MOBILE CONNECTION	POINTER TO MOBILE CONNECTION
SCR REQUEST FLAG	FLAG INDICATING THAT SERVICE PROFILE OF CN IS BEING CHANGED
SCR REQUEST SOURCE ADDRESS	IP ADDRESS OF ENTITY THAT HAS REQUESTED SCR

FIG. 35

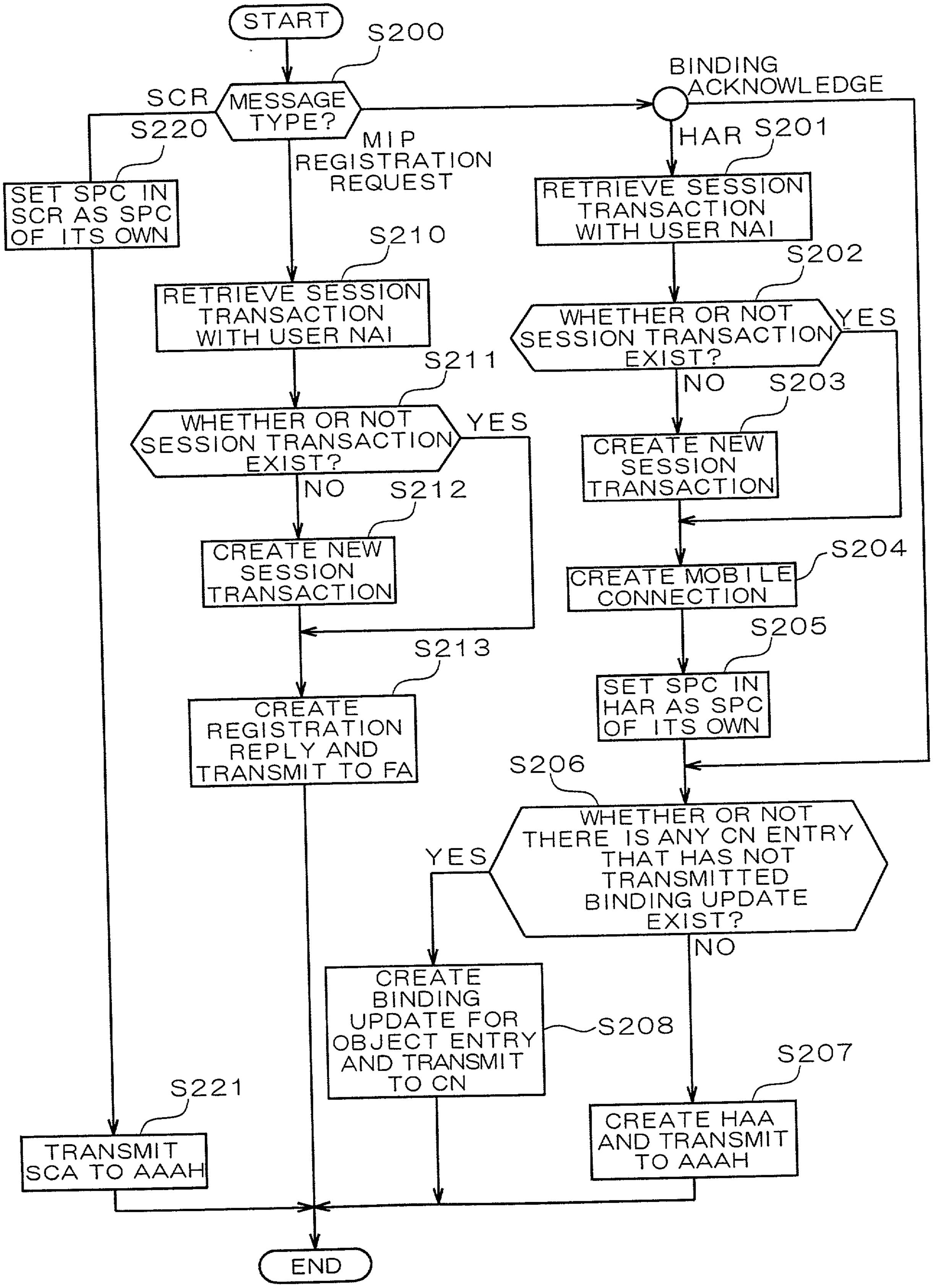

START
S200
MESSAGE TYPE?
SCR
S220
SET SPC IN SCR AS SPC OF ITS OWN
MIP REGISTRATION REQUEST
BINDING ACKNOWLEDGE
HAR
S201
RETRIEVE SESSION TRANSACTION WITH USER NAI
S210
RETRIEVE SESSION TRANSACTION WITH USER NAI
S202
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S203
CREATE NEW SESSION TRANSACTION
S211
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S212
CREATE NEW SESSION TRANSACTION
S204
CREATE MOBILE CONNECTION
S205
SET SPC IN HAR AS SPC OF ITS OWN
S213
CREATE REGISTRATION REPLY AND TRANSMIT TO FA
S206
WHETHER OR NOT THERE IS ANY CN ENTRY THAT HAS NOT TRANSMITTED BINDING UPDATE EXIST?
YES
NO
CREATE BINDING UPDATE FOR OBJECT ENTRY AND TRANSMIT TO CN
S208
S207
CREATE HAA AND TRANSMIT TO AAAH
S221
TRANSMIT SCA TO AAAH
END

FIG. 36

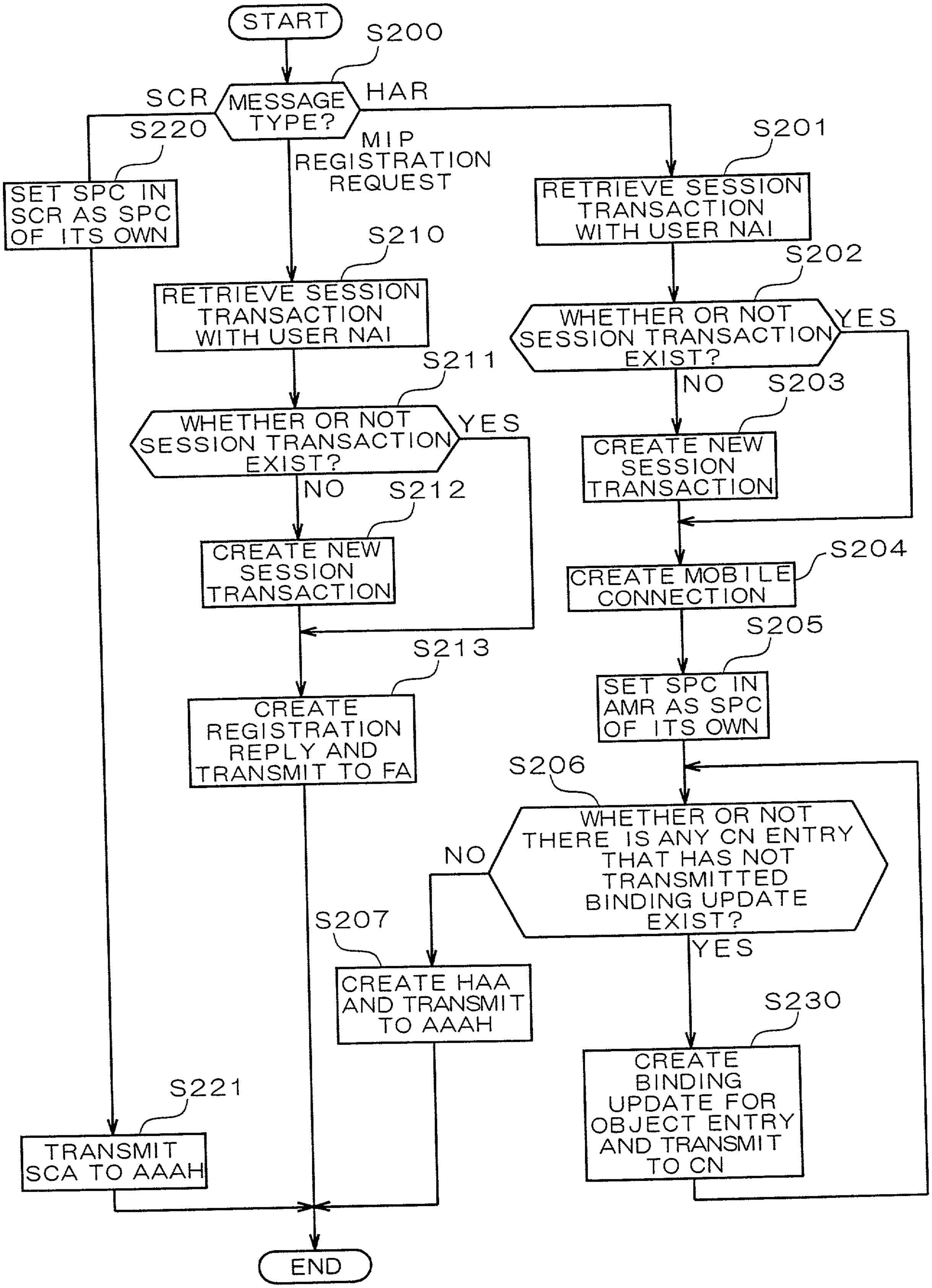

START
S200
MESSAGE TYPE?
SCR
HAR
MIP REGISTRATION REQUEST
S220
SET SPC IN SCR AS SPC OF ITS OWN
S201
RETRIEVE SESSION TRANSACTION WITH USER NAI
S210
RETRIEVE SESSION TRANSACTION WITH USER NAI
S202
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S203
CREATE NEW SESSION TRANSACTION
S211
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S212
CREATE NEW SESSION TRANSACTION
S204
CREATE MOBILE CONNECTION
S205
SET SPC IN AMR AS SPC OF ITS OWN
S213
CREATE REGISTRATION REPLY AND TRANSMIT TO FA
S206
WHETHER OR NOT THERE IS ANY CN ENTRY THAT HAS NOT TRANSMITTED BINDING UPDATE EXIST?
NO
YES
S207
CREATE HAA AND TRANSMIT TO AAAH
S230
CREATE BINDING UPDATE FOR OBJECT ENTRY AND TRANSMIT TO CN
S221
TRANSMIT SCA TO AAAH
END

FIG. 37

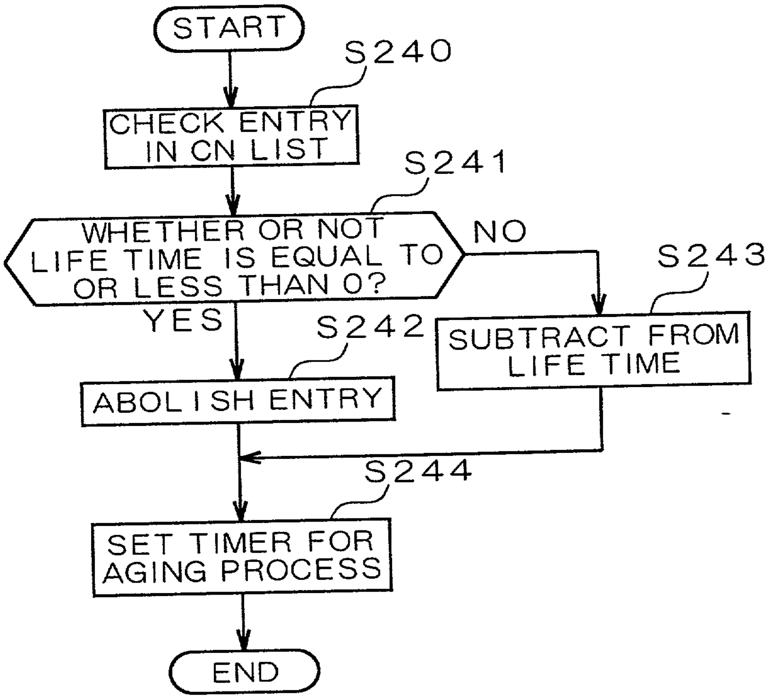

START
S240
CHECK ENTRY IN CN LIST
S241
WHETHER OR NOT LIFE TIME IS EQUAL TO OR LESS THAN 0?
NO
YES
S242
ABOLISH ENTRY
S243
SUBTRACT FROM LIFE TIME
S244
SET TIMER FOR AGING PROCESS
END

FIG. 38

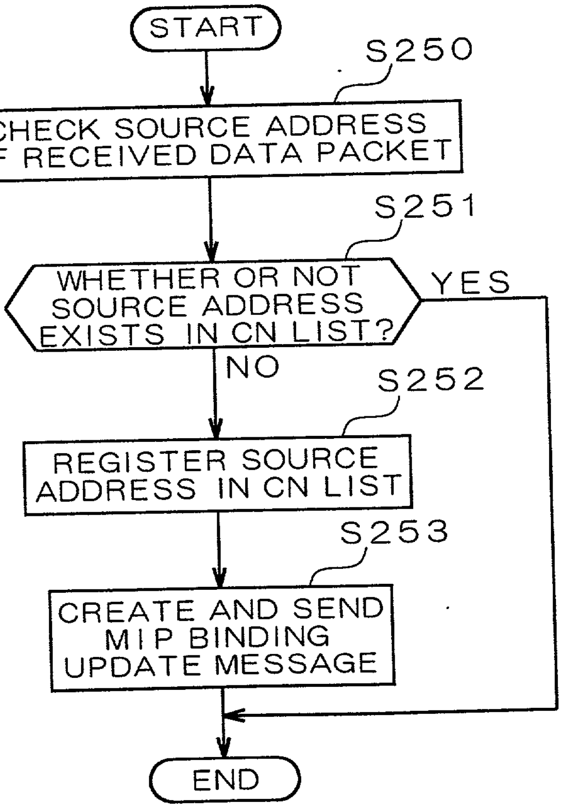

START
S250
CHECK SOURCE ADDRESS OF RECEIVED DATA PACKET
S251
WHETHER OR NOT SOURCE ADDRESS EXISTS IN CN LIST?
YES
NO
S252
REGISTER SOURCE ADDRESS IN CN LIST
S253
CREATE AND SEND MIP BINDING UPDATE MESSAGE
END

FIG. 39

STRUCTURAL ELEMENT	EXPLANATION
HOME ADDRESS	HOME ADDRESS ASSIGNED TO MN
CARE-OF-ADDRESS	IP ADDRESS OF FA TO WHICH MN CURRENTLY CONNECTED
LIFE TIME	TERM OF VALIDITY FOR BINDING CACHE
ENCAPSULATION METHOD	ENCAPSULATION METHOD BETWEEN CN AND FA

FIG. 40

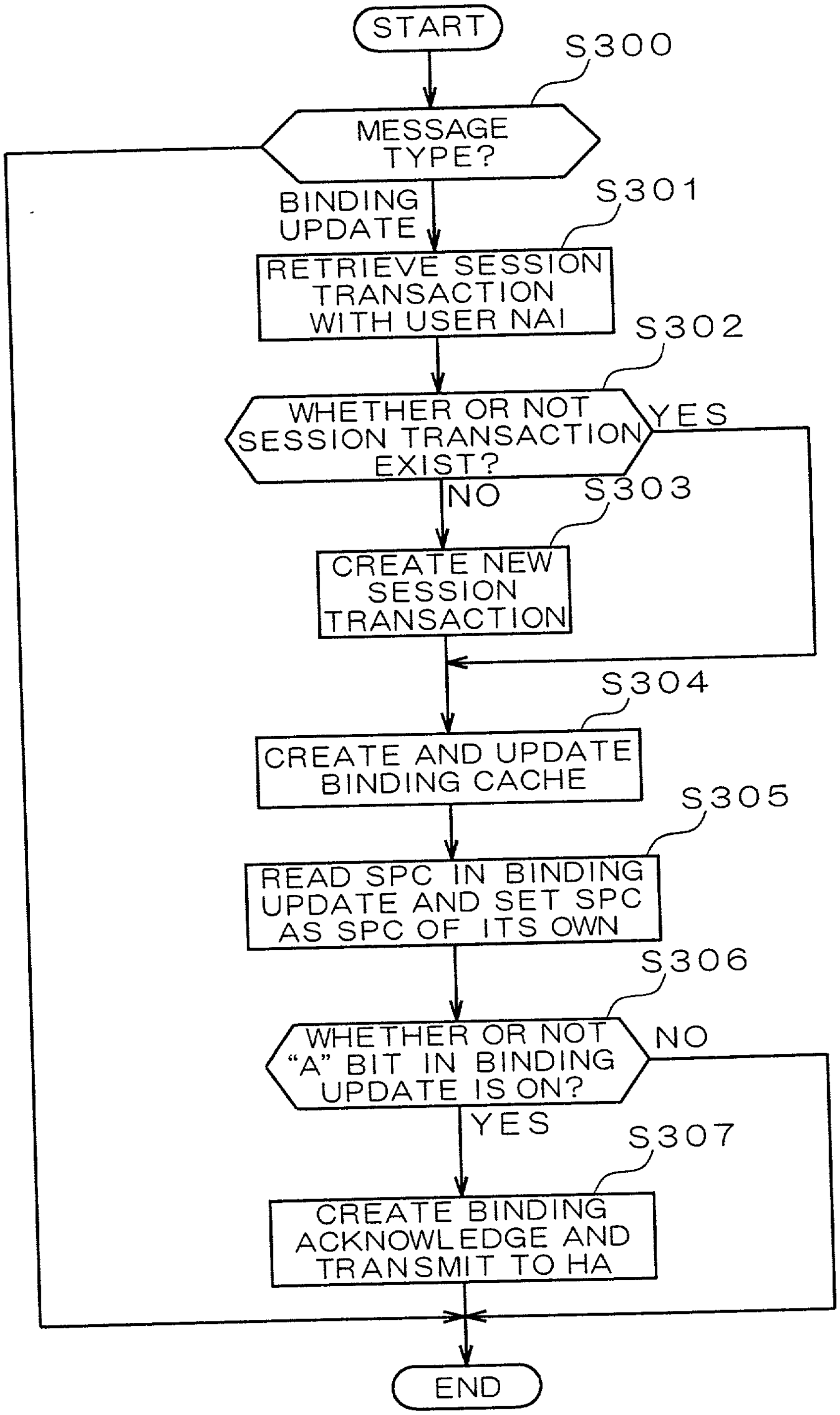

START
S300
MESSAGE TYPE?
BINDING UPDATE
S301
RETRIEVE SESSION TRANSACTION WITH USER NAI
S302
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S303
CREATE NEW SESSION TRANSACTION
S304
CREATE AND UPDATE BINDING CACHE
S305
READ SPC IN BINDING UPDATE AND SET SPC AS SPC OF ITS OWN
S306
WHETHER OR NOT "A" BIT IN BINDING UPDATE IS ON?
NO
YES
S307
CREATE BINDING ACKNOWLEDGE AND TRANSMIT TO HA
END

FIG. 41

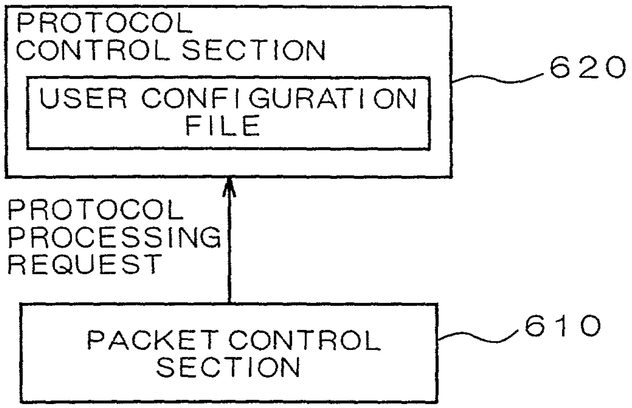
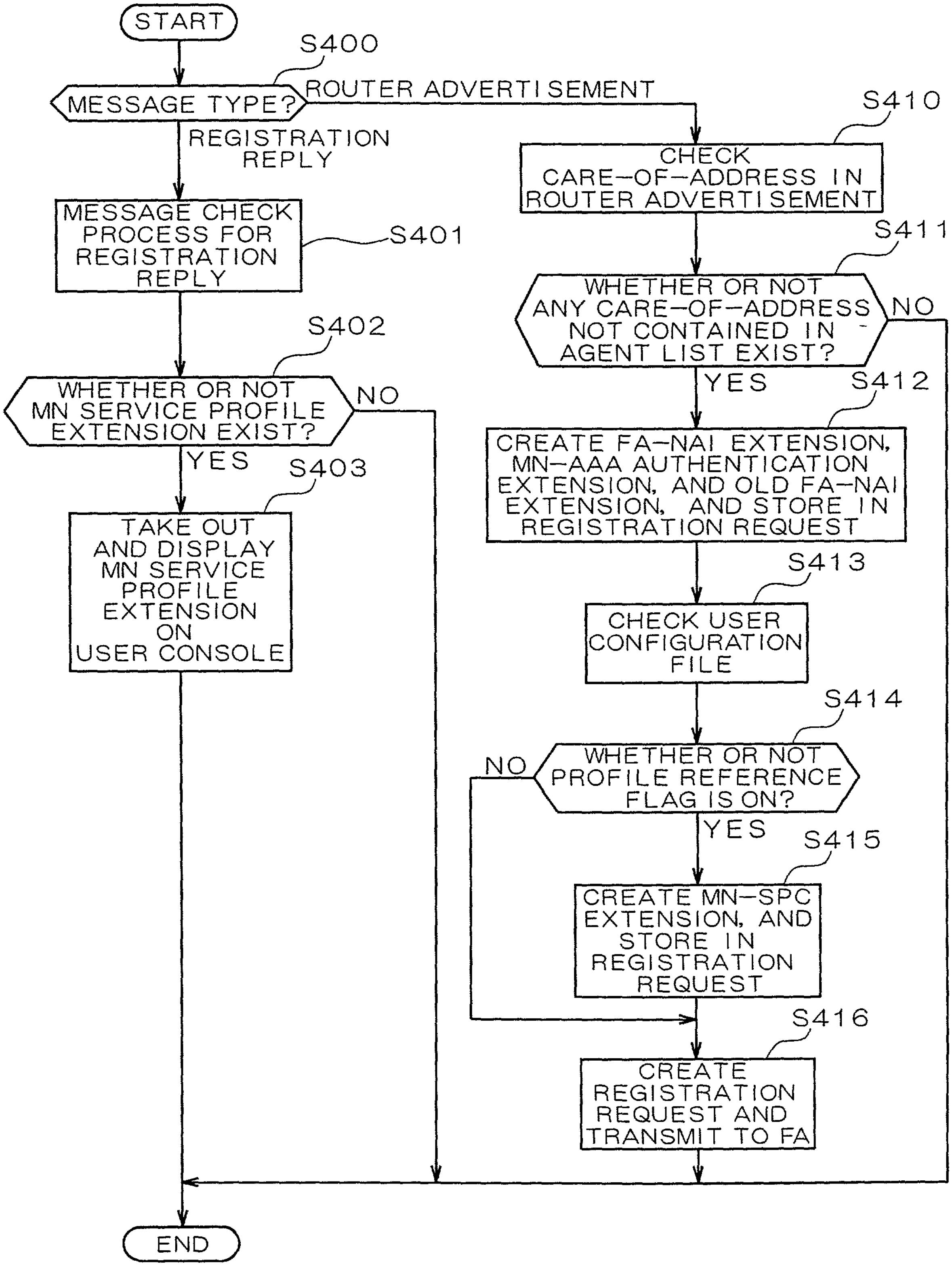


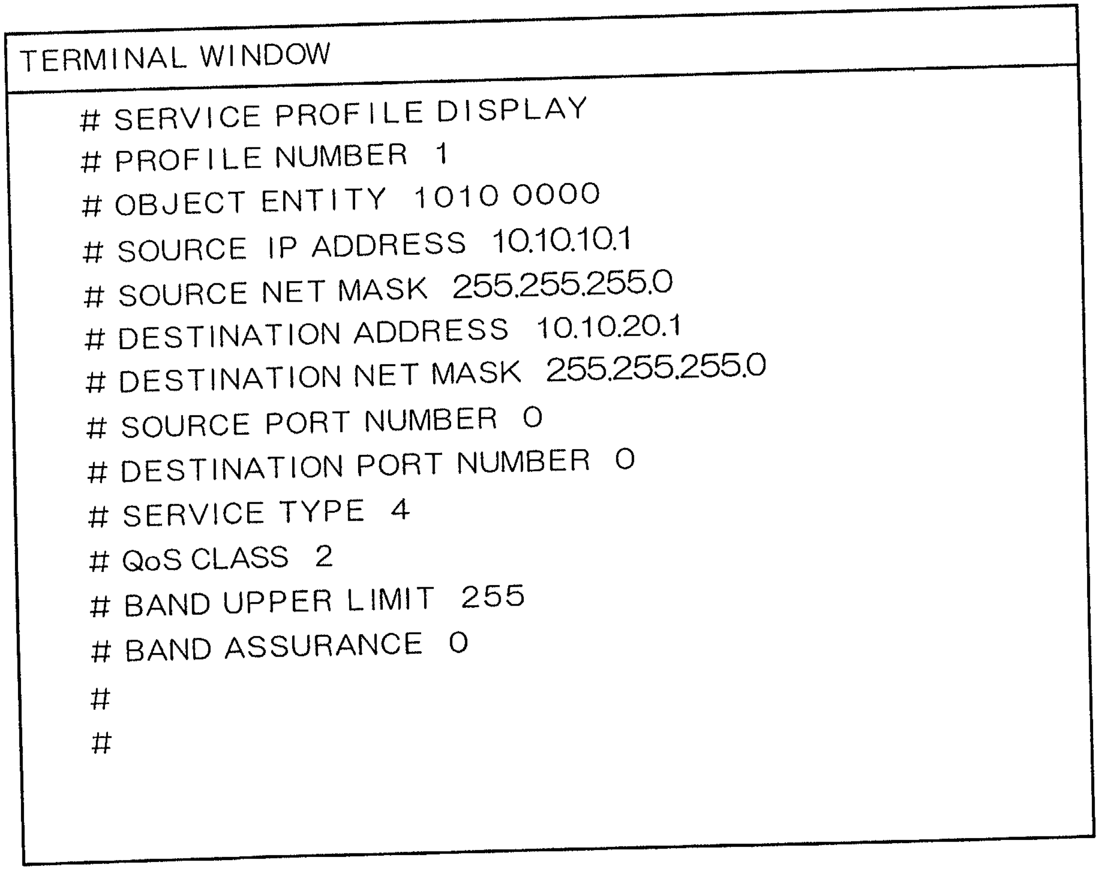
FIG. 42

STRUCTURAL ELEMENT	EXPLANATION
CARE-OF-ADDRESS 1	CARE-OF-ADDRESS IN ROUTER ADVERTISEMENT
CARE-OF-ADDRESS 2	CARE-OF-ADDRESS IN ROUTER ADVERTISEMENT

FIG. 43


START
S400
MESSAGE TYPE?
ROUTER ADVERTISEMENT
REGISTRATION REPLY
MESSAGE CHECK PROCESS FOR REGISTRATION REPLY
S401
S402
WHETHER OR NOT MN SERVICE PROFILE EXTENSION EXIST?
NO
YES
S403
TAKE OUT AND DISPLAY MN SERVICE PROFILE EXTENSION ON USER CONSOLE
S410
CHECK CARE-OF-ADDRESS IN ROUTER ADVERTISEMENT
S411
WHETHER OR NOT ANY CARE-OF-ADDRESS NOT CONTAINED IN AGENT LIST EXIST?
NO
YES
S412
CREATE FA-NAI EXTENSION, MN-AAA AUTHENTICATION EXTENSION, AND OLD FA-NAI EXTENSION, AND STORE IN REGISTRATION REQUEST
S413
CHECK USER CONFIGURATION FILE
S414
WHETHER OR NOT PROFILE REFERENCE FLAG IS ON?
NO
YES
S415
CREATE MN-SPC EXTENSION, AND STORE IN REGISTRATION REQUEST
S416
CREATE REGISTRATION REQUEST AND TRANSMIT TO FA
END

F/G. 44



TERMINAL WINDOW

```
# SERVICE PROFILE DISPLAY
# PROFILE NUMBER  1
# OBJECT ENTITY  1010 0000
# SOURCE  IP ADDRESS  10.10.10.1
# SOURCE NET MASK  255.255.255.0
# DESTINATION ADDRESS  10.10.20.1
# DESTINATION NET MASK  255.255.255.0
# SOURCE PORT NUMBER  0
# DESTINATION PORT NUMBER  0
# SERVICE TYPE  4
# QoS CLASS  2
# BAND UPPER LIMIT  255
# BAND ASSURANCE  0
#
#
```

FIG. 45

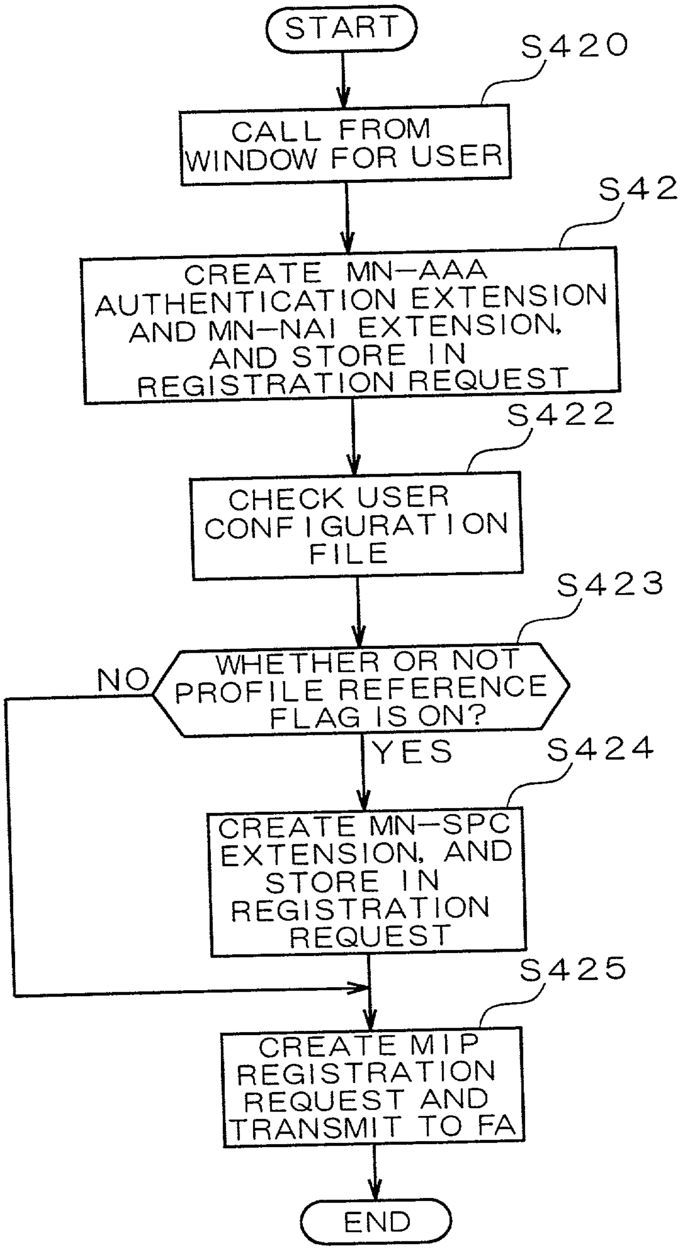

START
S420
CALL FROM WINDOW FOR USER
S421
CREATE MN-AAA AUTHENTICATION EXTENSION AND MN-NAI EXTENSION, AND STORE IN REGISTRATION REQUEST
S422
CHECK USER CONFIGURATION FILE
S423
WHETHER OR NOT PROFILE REFERENCE FLAG IS ON?
NO
YES
S424
CREATE MN-SPC EXTENSION, AND STORE IN REGISTRATION REQUEST
S425
CREATE MIP REGISTRATION REQUEST AND TRANSMIT TO FA
END

FIG. 46

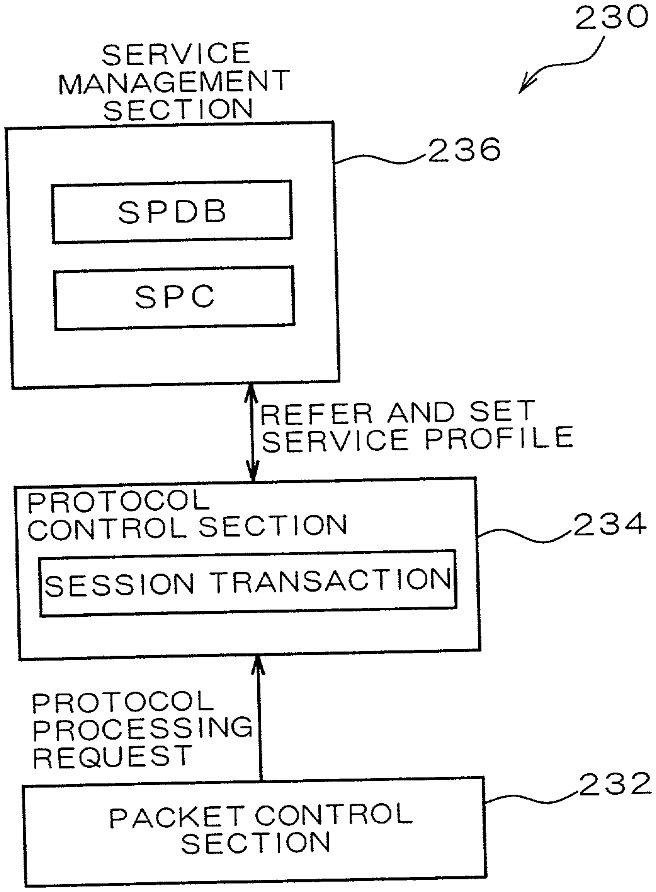

230
SERVICE MANAGEMENT SECTION
236
SPDB
SPC
REFER AND SET SERVICE PROFILE
PROTOCOL CONTROL SECTION
234
SESSION TRANSACTION
PROTOCOL PROCESSING REQUEST
232
PACKET CONTROL SECTION

FIG. 47

STRUCTURAL ELEMENT	EXPLANATION
SESSION ID	<NAI OF MN><32 BIT VALUE><OPTION>
AAAH ADDRESS	IP ADDRESS OF AAAH SPECIFIED BY NAI OF MN
HA ADDRESS	IP ADDRESS OF HA ASSIGNED BY AAAF
OLD FA-NAI	NAI OF OLD FA WHERE MN MOVE TO NEW FA
PRESENT FA-NAI	NAI OF FA WHICH MN CONNECTED AT PRESENT
SCR REQUEST SOURCE ADDRESS	IP ADDRESS OF AAAH THAT HAS REQUESTED SCR
SPC	
SESSION TIMER	TERM OF VALIDITY FOR THIS TRANSACTION
STATUS	PROCESS WAITING, HA REQUESTING, AMA PROCESSING, HA CHANGE REQUESTING, FA CHANGE REQUESTING

FIG. 48

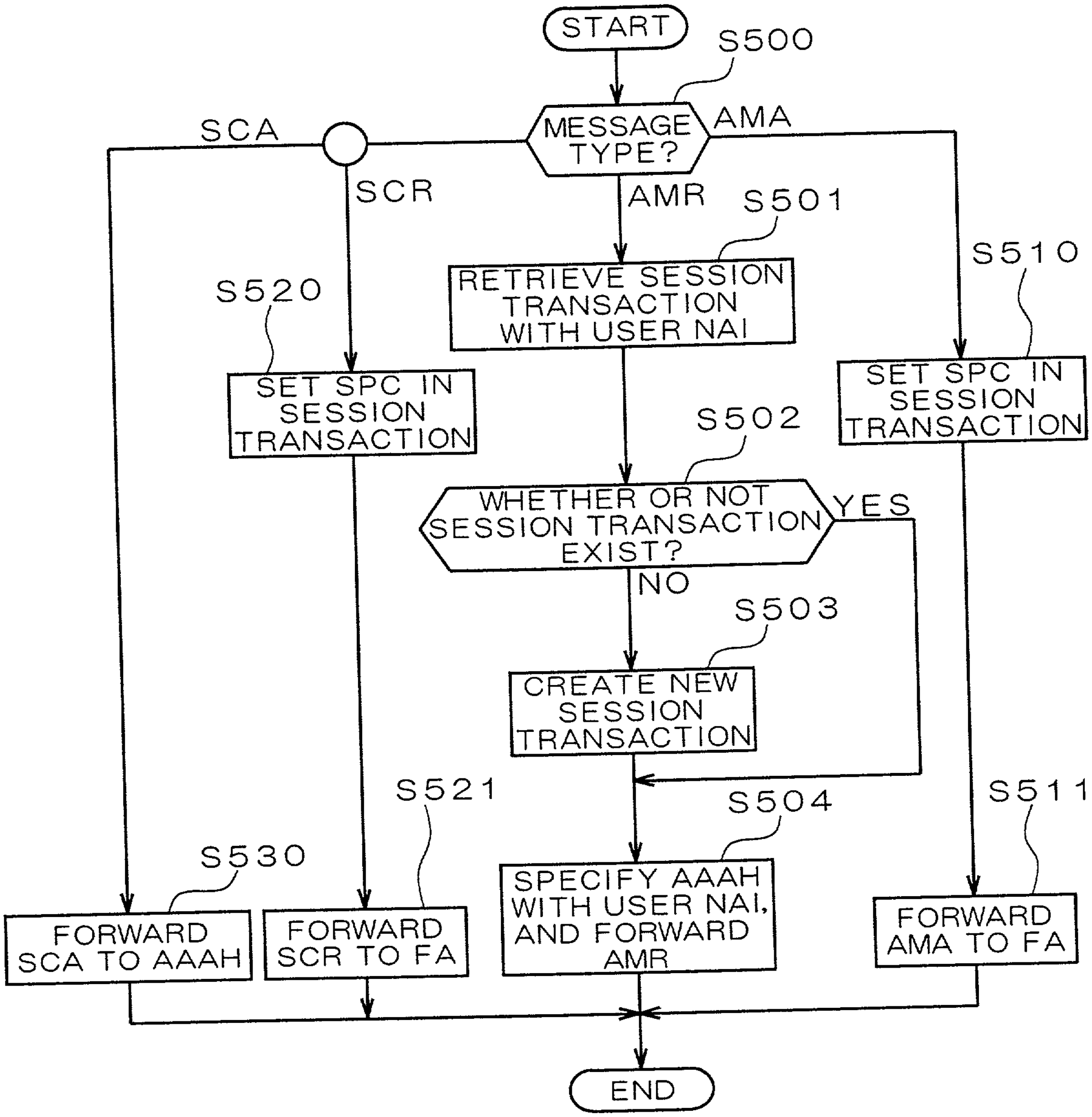

START
S500
MESSAGE TYPE?
SCA
SCR
AMR
AMA
S501
RETRIEVE SESSION TRANSACTION WITH USER NAI
S520
SET SPC IN SESSION TRANSACTION
S510
SET SPC IN SESSION TRANSACTION
S502
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S503
CREATE NEW SESSION TRANSACTION
S521
S504
S511
S530
FORWARD SCA TO AAAH
FORWARD SCR TO FA
SPECIFY AAAH WITH USER NAI, AND FORWARD AMR
FORWARD AMA TO FA
END

FIG. 49

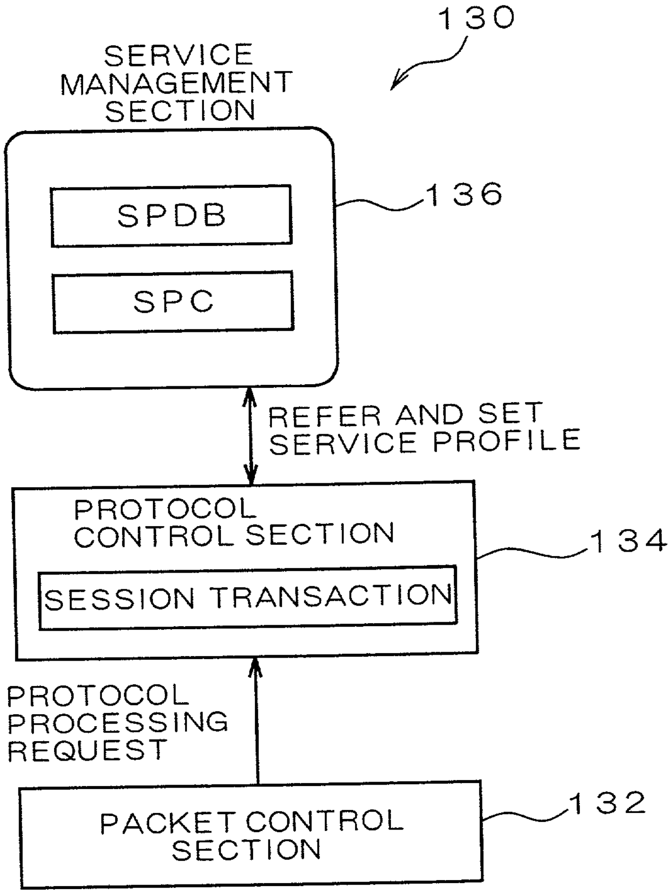

130
SERVICE MANAGEMENT SECTION
SPDB
SPC
136
REFER AND SET SERVICE PROFILE
PROTOCOL CONTROL SECTION
SESSION TRANSACTION
134
PROTOCOL PROCESSING REQUEST
PACKET CONTROL SECTION
132

FIG. 50

STRUCTURAL ELEMENT	EXPLANATION
SESSION.ID	<NAI OF MN><32 BIT VALUE><OPTION>
HA ADDRESS	IP ADDRESS OF HA ASSIGNED BY AAAH
HA ASSIGNED AAAF ADDRESS	IP ADDRESS OF AAAF ASSIGNMENT REQUESTED BY AAAH
PRESENT AAAF ADDRESS	IP ADDRESS OF AAAF THAT HAS REQUESTED AMR
OLD AAAF ADDRESS	IP ADDRESS OF OLD AAAF WHEN AAAF IS CHANGED
SESSION TIMER	TERM OF VALIDITY FOR THIS TRANSACTION
SPC	
STATUS	PROCESS WAITING, HA REQUESTING, HA CHANGE REQUESTING, FA CHANGE REQUESTING, FA CHANGE REQUESTING 2

F/G. 51

STRUCTURAL ELEMENT	EXPLANATION
USER NAI	NAI OF MOBILE TERMINAL EQUIPMENT
USER SPI	FOR USE WHEN AUTHENTICATING USER
USER CONTRACT SERVICE CLASS	INDICATING AVAILABLE SERVICE, QoS, MAXIMUM NUMBER OF PROFILES OF THIS CLASS
ACTUAL SERVICE CLASS USED BY USER	CONTRACT SERVICE CLASS OF USER BY DEFAULT, BUT MAY BE HIGHER LEVEL SERVICE CLASS IS APPLICABLE DEPENDING ON CONDITION OF NETWORK UTILIZATION UNDER SUPERVISION OF NETWORK RESOURCE MANAGEMENT SYSTEM

FIG. 52

STRUCTURAL ELEMENT	CLASS				EXPLANATION
SERVICE CLASS IDENTIFIER	0	1	2	3	IDENTIFIER INDICATING CLASS
APPLICABLE SERVICE	ALL OFF	SEE FIG. 53	SEE FIG. 53	SEE FIG. 53	INDICATING AVAILABLE SERVICE IN UNIT OF SERVICE CLASS (ON/OFF)
MAXIMUM NUMBER OF PROFILES	0	1	1	1	MAXIMUM NUMBER OF PROFILES THAT IS ALLOWABLE FOR THIS SERVICE CLASS

FIG. 53

SERVICE TYPE	DIFFERENTIATED SERVICE	PACKET FILTERING	SECURITY SERVICE	BAND CONTROL
CLASS 0	OFF	OFF	OFF	OFF
CLASS 1	OFF	OFF	OFF	ON
CLASS 2	OFF	OFF	OFF	ON
CLASS 3	OFF	OFF	OFF	ON

FIG. 54

NUMBER	STRUCTURAL ELEMENT	EXPLANATION
0	RESERVATION VALUE	RESERVATION VALUE OF FUTURE
1	DIFFERENTIATED SERVICE	SERVICE ON BASIS OF DIFFERENTIATED SERVICE (RFC2474, 2475)
2	PACKET FILTERING	SERVICE FOR FILTERING PACKET WITH IP ADDRESS OF PACKET OR PORT NUMBER
3	SECURITY SERVICE	SECURE SERVICE USING IPSEC
4	BAND CONTROL	SERVICE FOR CONTROLING AVAILABLE BAND FOR MOBILE TERMINAL EQUIPMENT

FIG. 55

STRUCTURAL ELEMENT	CLASS			
CLASS IDENTIFIER	0	1	2	3
APPLICABLE QoS	0	2	3	4

FIG. 56

QoS	0	1	2	3	4
AVAILABLE BAND	NOT AVAILABLE	0~100 (kbps)	0~255 (kbps)	0~512 (kbps)	0~1500 (kbps)
BAND ASSURANCE	NO	YES	NO	NO	NO

FIG. 57

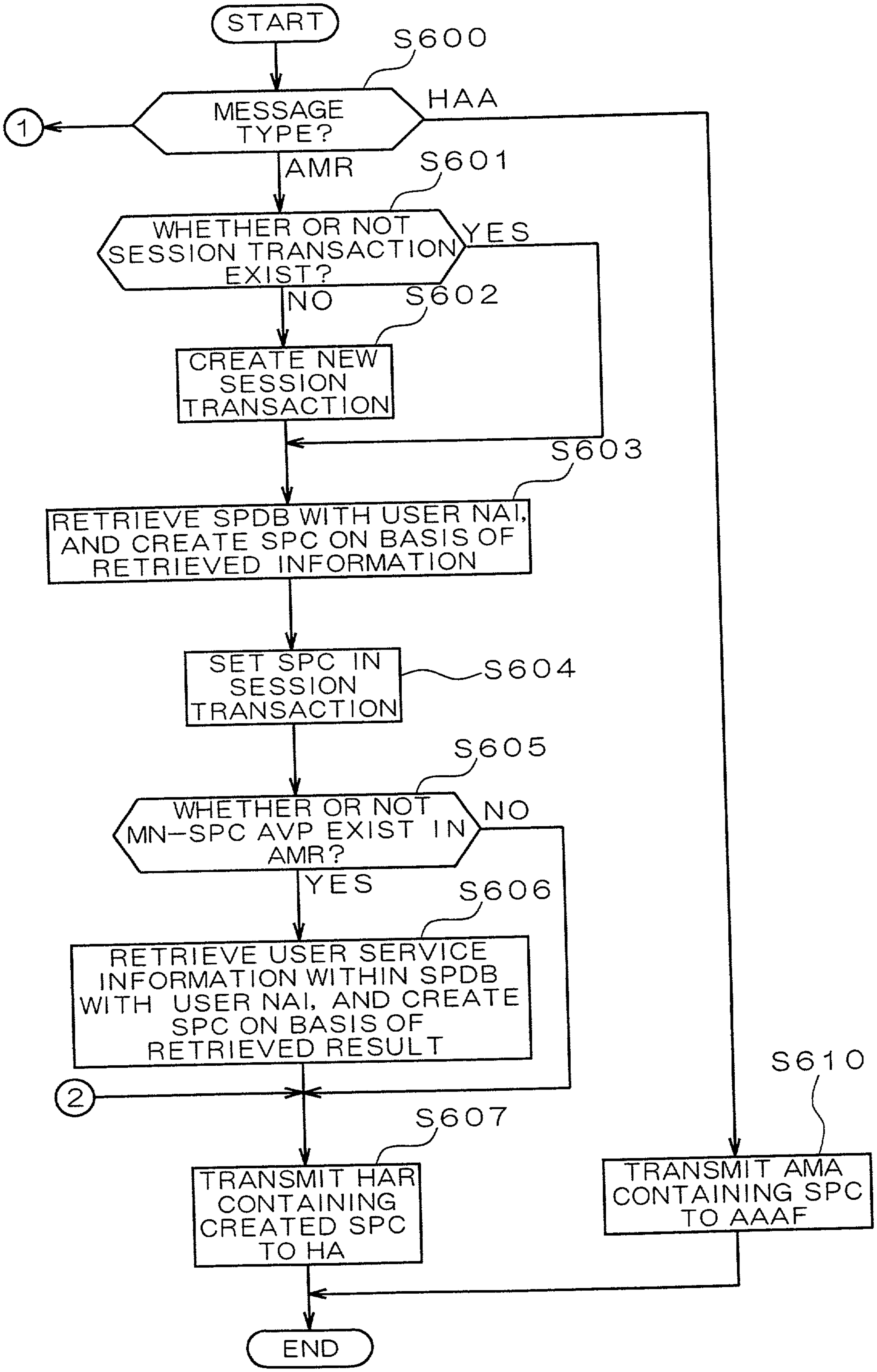

START
S600
MESSAGE TYPE?
HAA
1
AMR
S601
WHETHER OR NOT SESSION TRANSACTION EXIST?
YES
NO
S602
CREATE NEW SESSION TRANSACTION
S603
RETRIEVE SPDB WITH USER NAI, AND CREATE SPC ON BASIS OF RETRIEVED INFORMATION
SET SPC IN SESSION TRANSACTION
S604
S605
WHETHER OR NOT MN-SPC AVP EXIST IN AMR?
NO
YES
S606
RETRIEVE USER SERVICE INFORMATION WITHIN SPDB WITH USER NAI, AND CREATE SPC ON BASIS OF RETRIEVED RESULT
2
S607
TRANSMIT HAR CONTAINING CREATED SPC TO HA
S610
TRANSMIT AMA CONTAINING SPC TO AAAF
END

FIG. 58

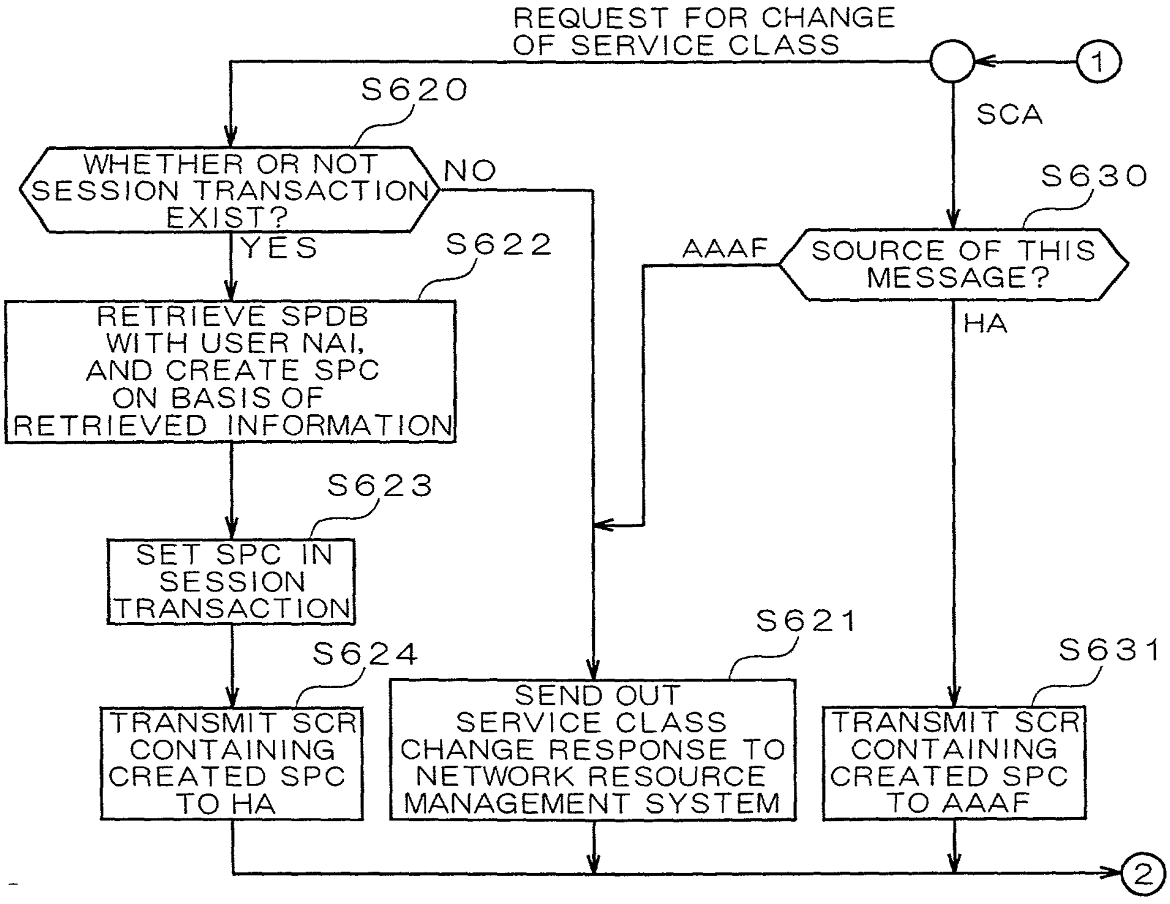

REQUEST FOR CHANGE OF SERVICE CLASS
①
SCA
S620
WHETHER OR NOT SESSION TRANSACTION EXIST?
NO
YES
S630
AAAF
SOURCE OF THIS MESSAGE?
HA
S622
RETRIEVE SPDB WITH USER NAI, AND CREATE SPC ON BASIS OF RETRIEVED INFORMATION
S623
SET SPC IN SESSION TRANSACTION
S624
TRANSMIT SCR CONTAINING CREATED SPC TO HA
S621
SEND OUT SERVICE CLASS CHANGE RESPONSE TO NETWORK RESOURCE MANAGEMENT SYSTEM
S631
TRANSMIT SCR CONTAINING CREATED SPC TO AAAF
②

FIG. 59

MANAGEMENT ID	MANAGEMENT ENTITY (IP ADDRESS)	MAXIMUM CIRCUIT USAGE EFFICIENCY (%)	THRESHOLD OF MAXIMUM CIRCUIT USAGE EFFICIENCY (%)
5	10. 10. 10. 1	45	70
12	10. 10. 20. 1	42	70
3	10. 10. 30. 1	35	70

FIG. 60

NAI	CONTRACT SERVICE CLASS	SERVICE CLASS ACTUALLY USED	STATUS
Aaa@xxx	1	2	NORMAL
Bbb@yyy	2	2	NORMAL
Ccc@yyy	1	1	NORMAL

FIG. 61

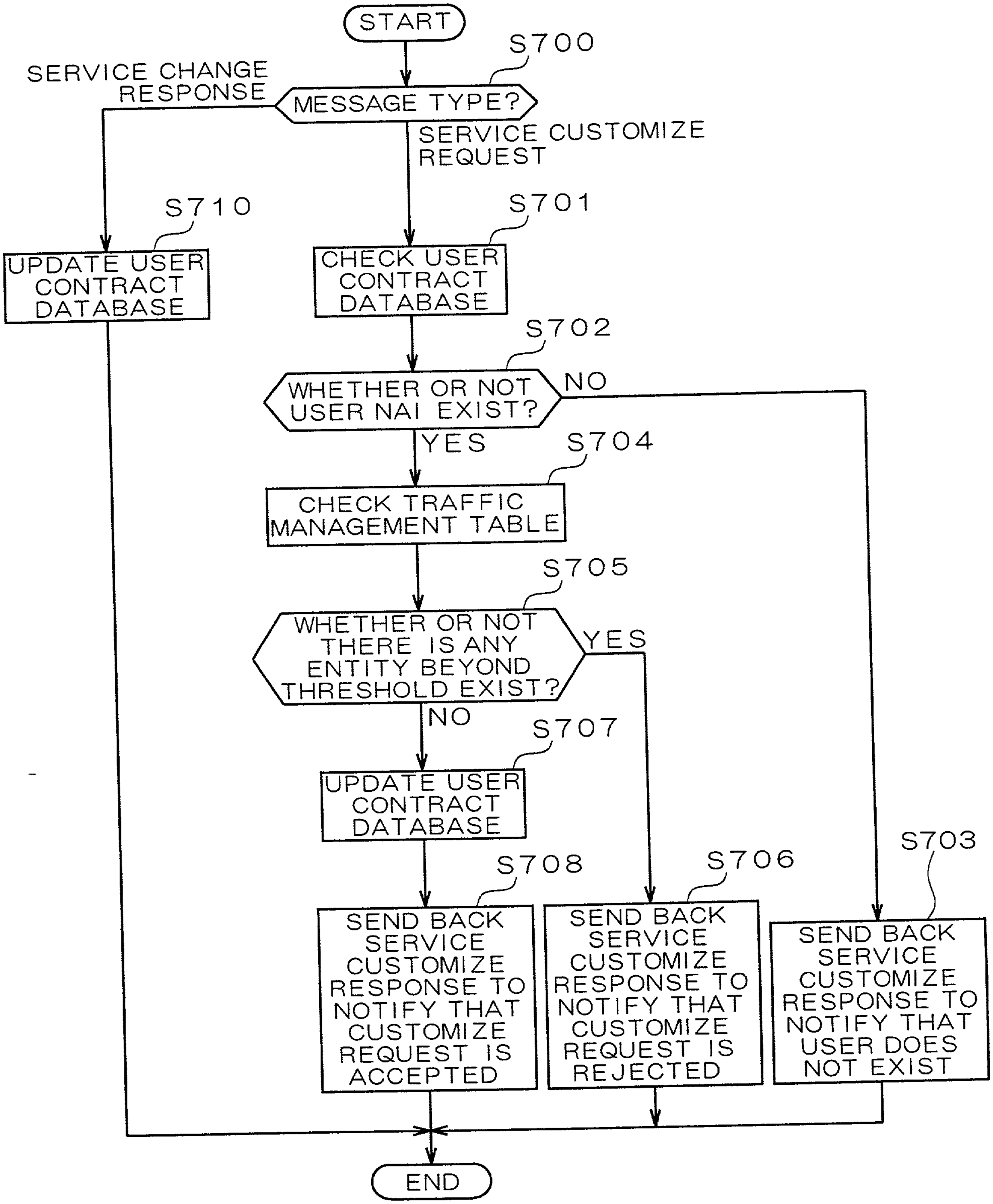
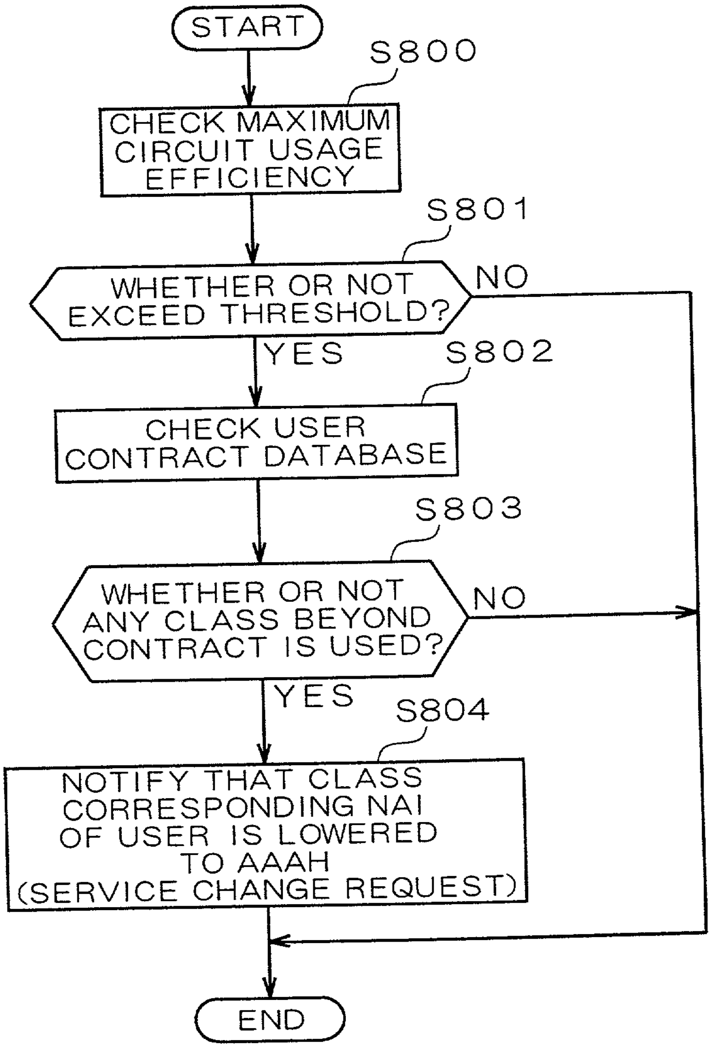

START
S700
MESSAGE TYPE?
SERVICE CHANGE RESPONSE
SERVICE CUSTOMIZE REQUEST
S710
UPDATE USER CONTRACT DATABASE
S701
CHECK USER CONTRACT DATABASE
S702
WHETHER OR NOT USER NAI EXIST?
NO
YES
S704
CHECK TRAFFIC MANAGEMENT TABLE
S705
WHETHER OR NOT THERE IS ANY ENTITY BEYOND THRESHOLD EXIST?
YES
NO
S707
UPDATE USER CONTRACT DATABASE
S708
SEND BACK SERVICE CUSTOMIZE RESPONSE TO NOTIFY THAT CUSTOMIZE REQUEST IS ACCEPTED
S706
SEND BACK SERVICE CUSTOMIZE RESPONSE TO NOTIFY THAT CUSTOMIZE REQUEST IS REJECTED
S703
SEND BACK SERVICE CUSTOMIZE RESPONSE TO NOTIFY THAT USER DOES NOT EXIST
END

FIG. 62


START
S800
CHECK MAXIMUM CIRCUIT USAGE EFFICIENCY
S801
WHETHER OR NOT EXCEED THRESHOLD?
NO
YES
S802
CHECK USER CONTRACT DATABASE
S803
WHETHER OR NOT ANY CLASS BEYOND CONTRACT IS USED?
NO
YES
S804
NOTIFY THAT CLASS CORRESPONDING NAI OF USER IS LOWERED TO AAAH (SERVICE CHANGE REQUEST)
END

F/G. 63

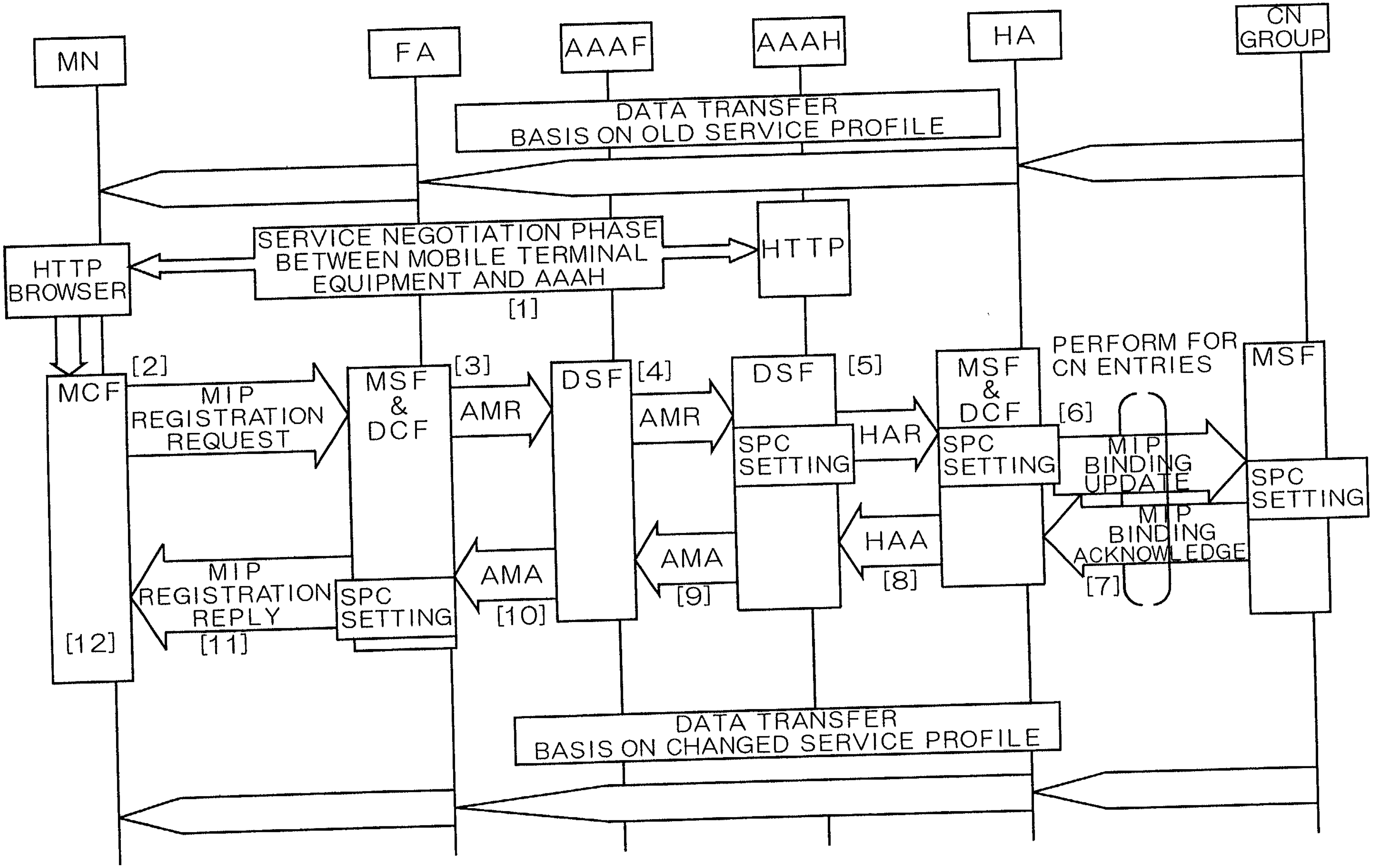

MN
FA
AAAF
AAAH
HA
CN GROUP
DATA TRANSFER BASIS ON OLD SERVICE PROFILE
SERVICE NEGOTIATION PHASE BETWEEN MOBILE TERMINAL EQUIPMENT AND AAAH
[1]
HTTP BROWSER
HTTP
[2]
MCF
MIP REGISTRATION REQUEST
MSF & DCF
[3]
AMR
DSF
[4]
AMR
DSF
SPC SETTING
[5]
HAR
MSF & DCF
SPC SETTING
PERFORM FOR CN ENTRIES
[6]
MIP BINDING UPDATE
MSF
SPC SETTING
MIP BINDING ACKNOWLEDGE
[7]
HAA
[8]
AMA
[9]
AMA
[10]
SPC SETTING
MIP REGISTRATION REPLY
[11]
[12]
DATA TRANSFER BASIS ON CHANGED SERVICE PROFILE

FIG. 64

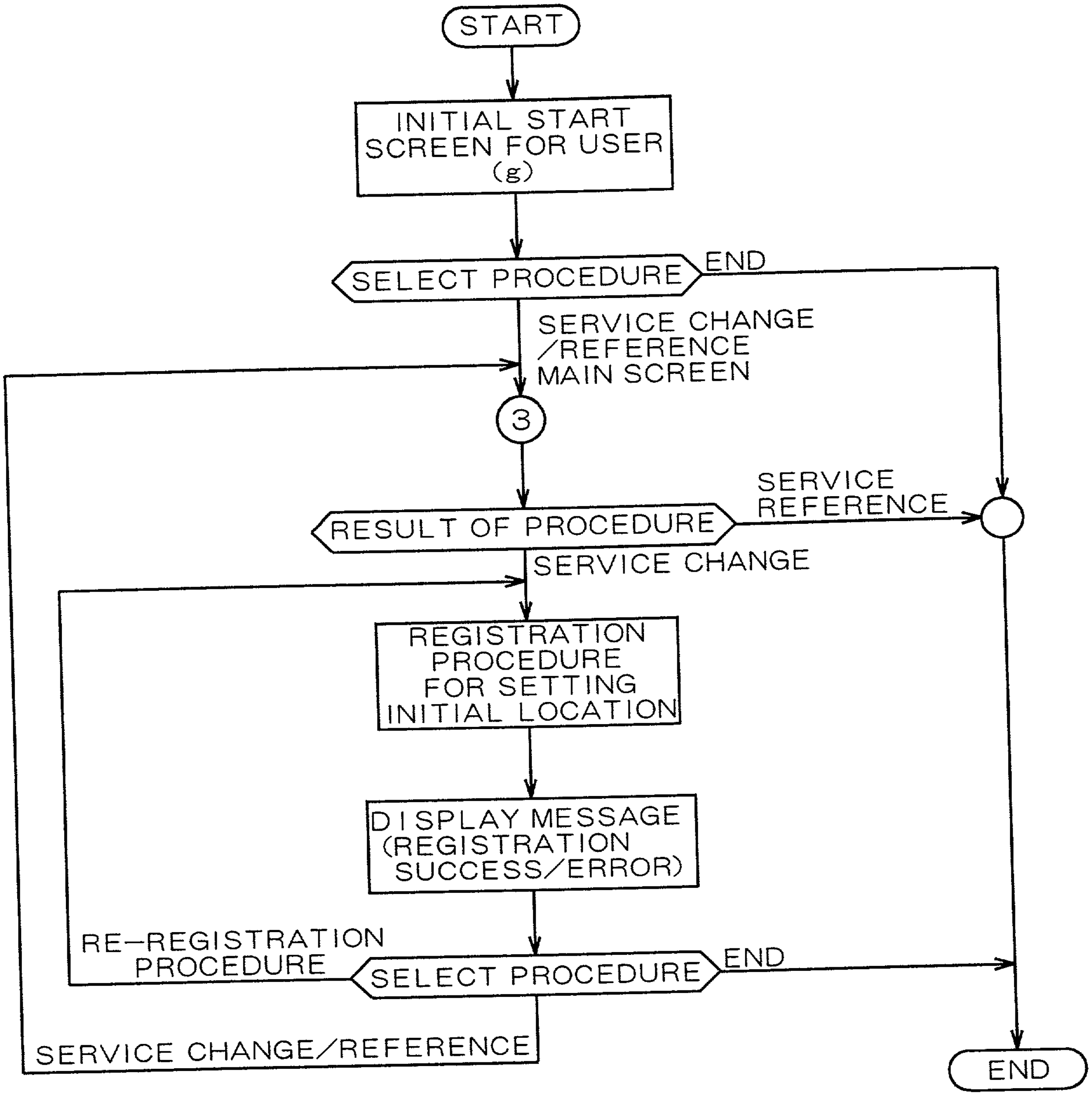

START
INITIAL START SCREEN FOR USER (g)
SELECT PROCEDURE
END
SERVICE CHANGE /REFERENCE MAIN SCREEN
3
RESULT OF PROCEDURE
SERVICE REFERENCE
SERVICE CHANGE
REGISTRATION PROCEDURE FOR SETTING INITIAL LOCATION
DISPLAY MESSAGE (REGISTRATION SUCCESS/ERROR)
RE-REGISTRATION PROCEDURE
SELECT PROCEDURE
END
SERVICE CHANGE/REFERENCE
END

FIG. 65

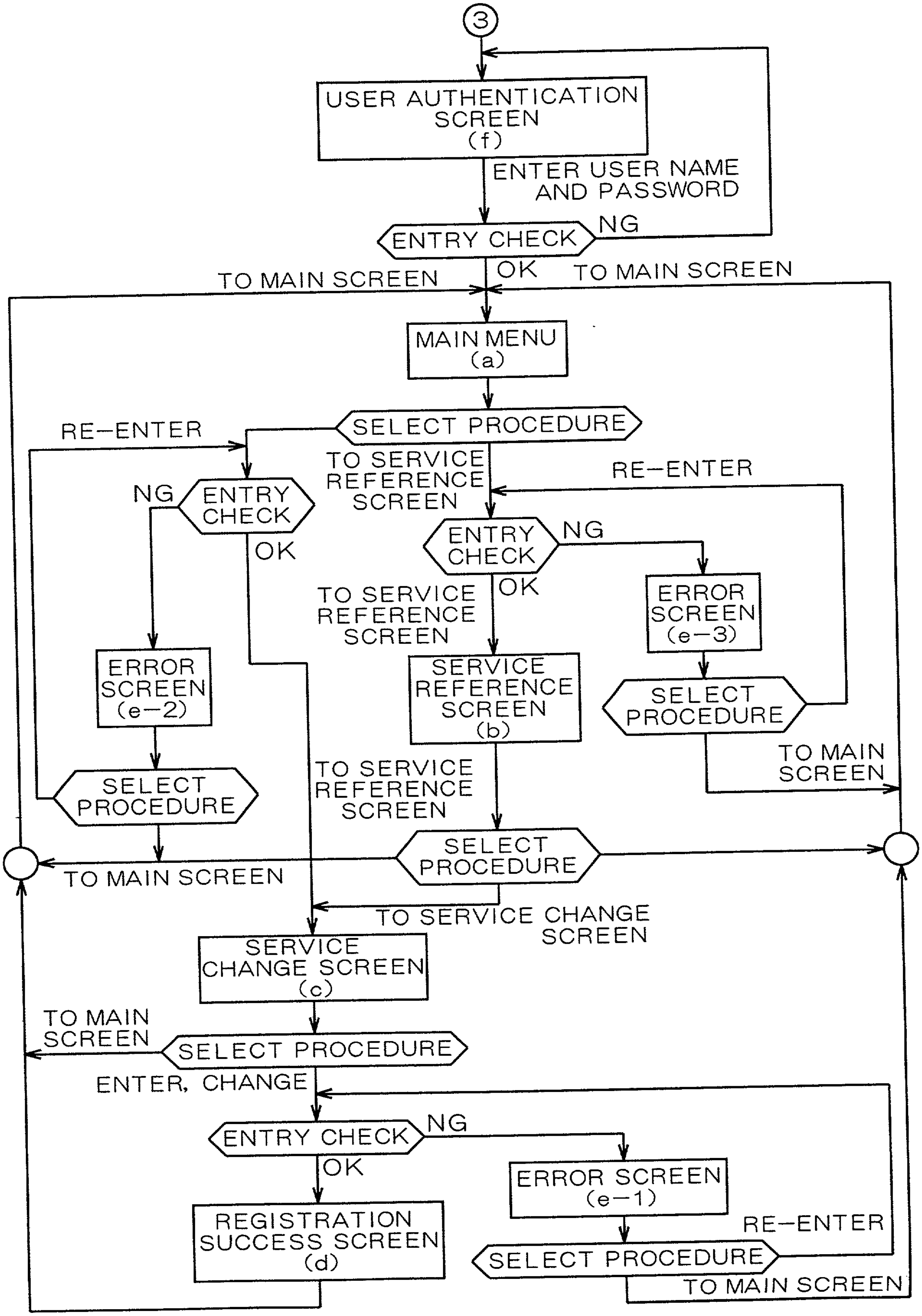
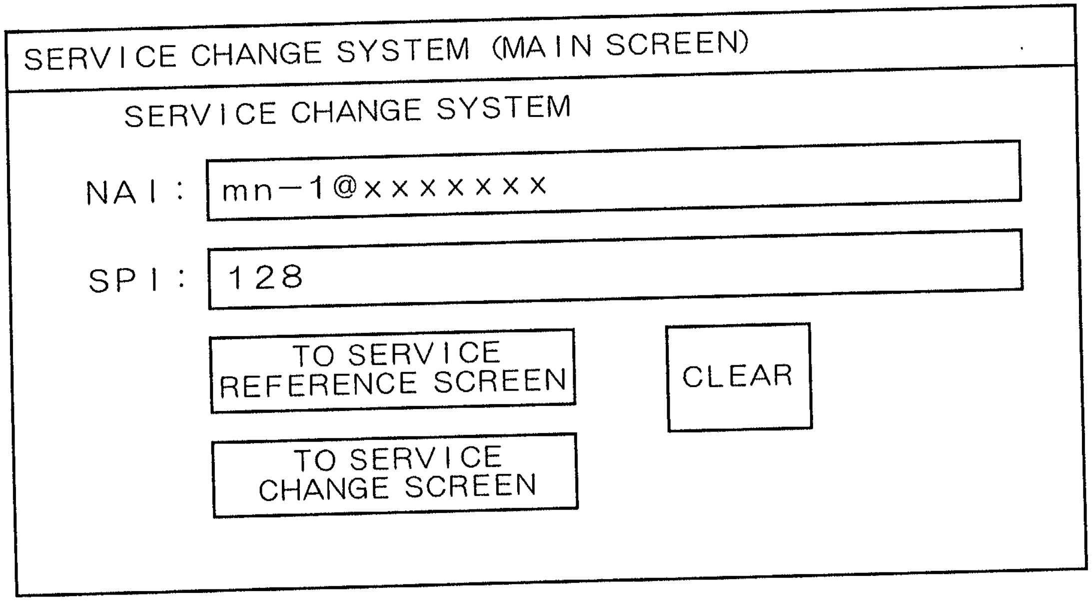

3
USER AUTHENTICATION SCREEN (f)
ENTER USER NAME AND PASSWORD
ENTRY CHECK
NG
OK
TO MAIN SCREEN
TO MAIN SCREEN
MAIN MENU (a)
SELECT PROCEDURE
RE-ENTER
TO SERVICE REFERENCE SCREEN
RE-ENTER
NG
ENTRY CHECK
OK
ENTRY CHECK
NG
TO SERVICE REFERENCE SCREEN
OK
ERROR SCREEN (e-3)
ERROR SCREEN (e-2)
SERVICE REFERENCE SCREEN (b)
SELECT PROCEDURE
TO MAIN SCREEN
SELECT PROCEDURE
TO SERVICE REFERENCE SCREEN
SELECT PROCEDURE
TO MAIN SCREEN
TO SERVICE CHANGE SCREEN
SERVICE CHANGE SCREEN (c)
TO MAIN SCREEN
SELECT PROCEDURE
ENTER, CHANGE
ENTRY CHECK
NG
OK
ERROR SCREEN (e-1)
REGISTRATION SUCCESS SCREEN (d)
RE-ENTER
SELECT PROCEDURE
TO MAIN SCREEN

FIG. 66

ID	NAME OF WUI PROCESS	TITLE OF FILE	NOTE
a	MAIN SCREEN	Service.php3	MAIN SCREEN FOR SERVICE CHANGE SYSTEM
b	SERVICE REFERENCE SCREEN	Service.php3	SERVICE REGISTRATION INFORMATION AT PRESENT IS DISPLAYED.
c	SERVICE CHANGE SCREEN	Service.php3	SERVICE REGISTRATION INFORMATION AT PRESENT AND RANGE OF SERVICE CHANGE AREA DISPLAYED. REQUEST FOR CHANGING SERVICE IS AVAILABLE IN RANGE OF SERVICE CHANGE.
d	REGISTRATION SUCCESS SCREEN	Success.php3	REGISTRATION SUCCESS SCREEN IS DISPLAYED WHEN REQUEST FOR CHANGING SERVICE IS SUCCESSFUL.
e−1	ERROR SCREEN	Err.php3	SERVICE CHANGE ERROR
e−2	ERROR SCREEN	Err.php3	START UP SERVICE CHANGE SCREEN ERROR
e−3	ERROR SCREEN	Err.php3	SERVICE REFERENCE SCREEN START UP ERROR
f	ISP AUTHENTICATION SCREEN	Service.php3	USER AUTHENTICATING SCREEN FOR ISP
g	INITIAL START SCREEN FOR USER	User.html	LOCAL PAGE FOR USER. INITIAL LOCATION REGISTRATION REQUEST PROCEDURE IS CALLED FROM THIS PAGE.

F/G. 67



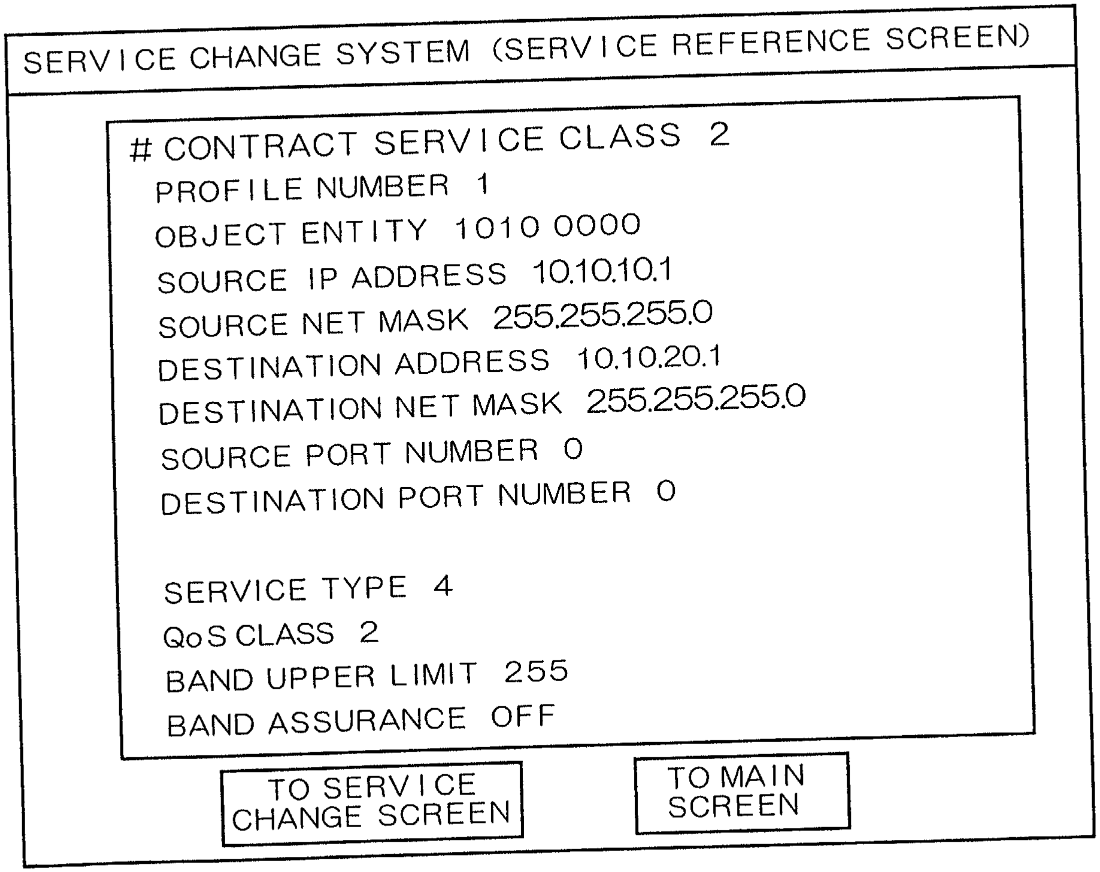
SERVICE CHANGE SYSTEM (MAIN SCREEN)

SERVICE CHANGE SYSTEM

NAI : mn−1@xxxxxxx

SPI : 128

FIG. 68



SERVICE CHANGE SYSTEM (SERVICE REFERENCE SCREEN)

\# CONTRACT SERVICE CLASS 2

PROFILE NUMBER 1

OBJECT ENTITY 1010 0000

SOURCE IP ADDRESS 10.10.10.1

SOURCE NET MASK 255.255.255.0

DESTINATION ADDRESS 10.10.20.1

DESTINATION NET MASK 255.255.255.0

SOURCE PORT NUMBER 0

DESTINATION PORT NUMBER 0

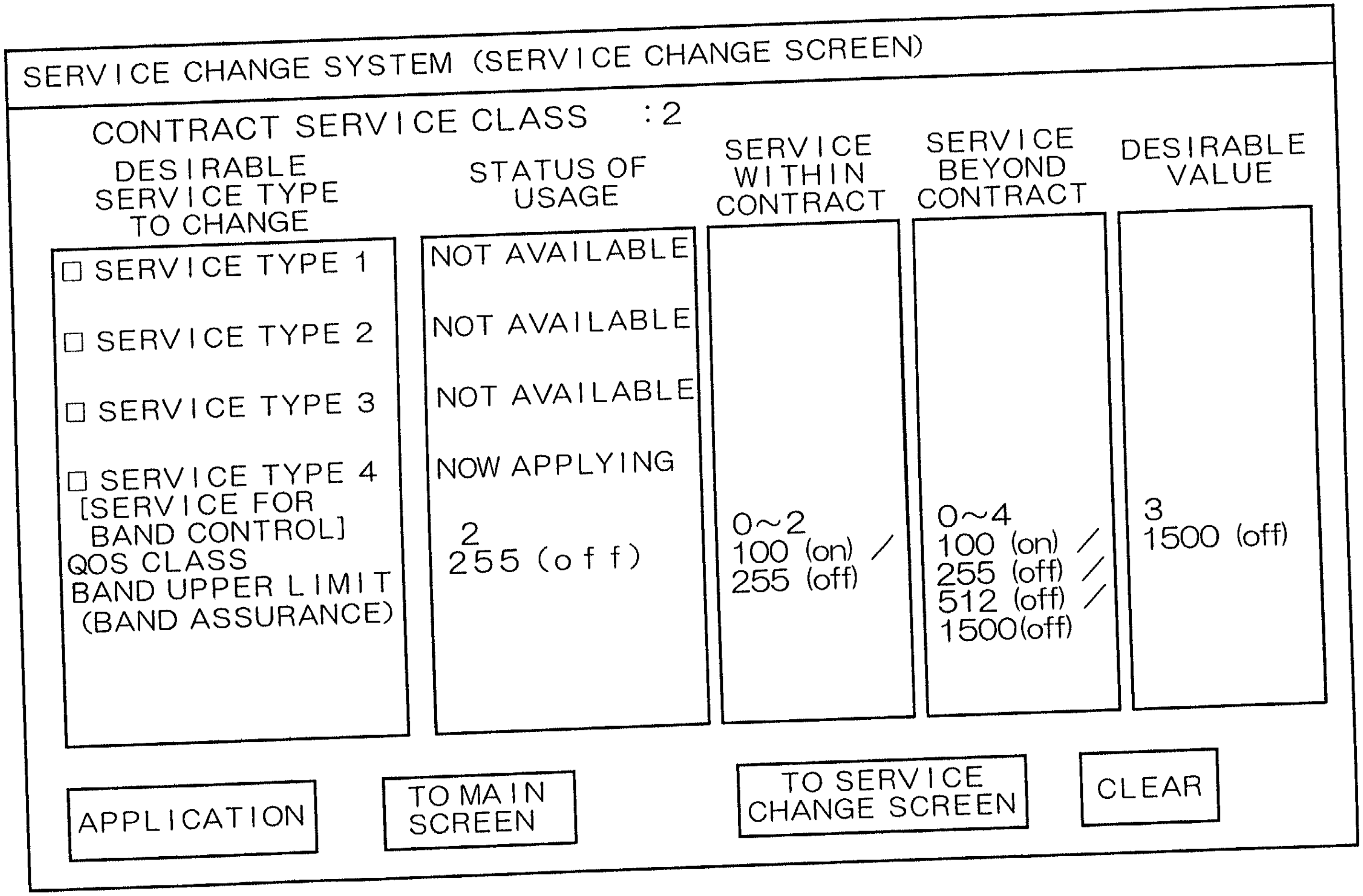
SERVICE TYPE 4

QoS CLASS 2

BAND UPPER LIMIT 255

BAND ASSURANCE OFF

FIG. 69

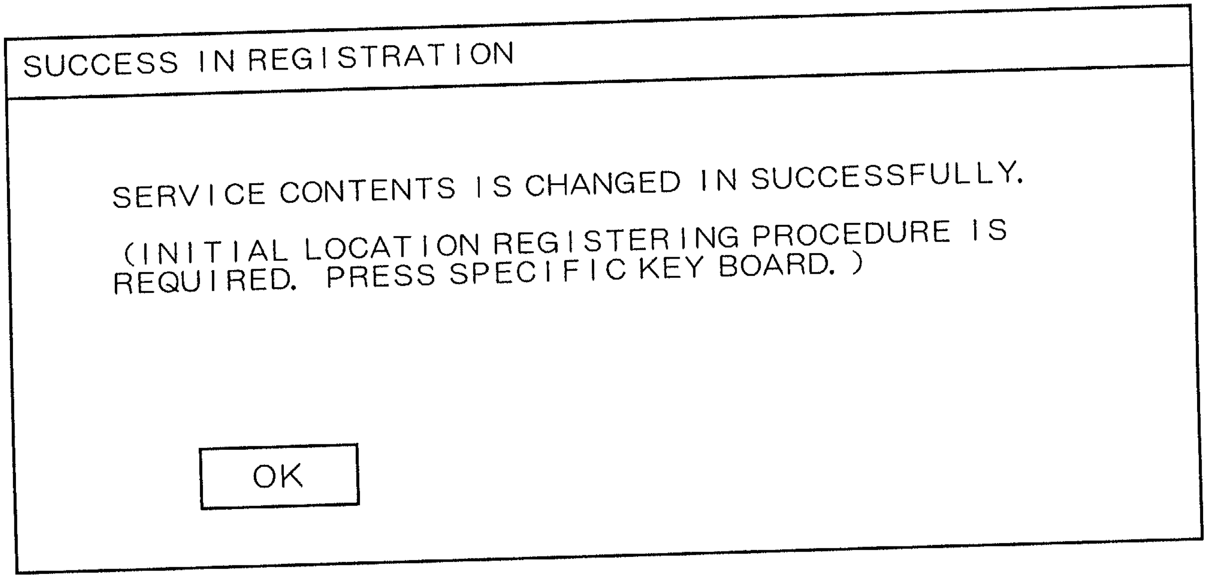


SERVICE CHANGE SYSTEM (SERVICE CHANGE SCREEN)

CONTRACT SERVICE CLASS :2

DESIRABLE SERVICE TYPE TO CHANGE	STATUS OF USAGE	SERVICE WITHIN CONTRACT	SERVICE BEYOND CONTRACT	DESIRABLE VALUE
☐ SERVICE TYPE 1	NOT AVAILABLE			
☐ SERVICE TYPE 2	NOT AVAILABLE			
☐ SERVICE TYPE 3	NOT AVAILABLE			
☐ SERVICE TYPE 4 [SERVICE FOR BAND CONTROL]	NOW APPLYING			
QOS CLASS	2	0~2	0~4	3
BAND UPPER LIMIT (BAND ASSURANCE)	255 (off)	100 (on) / 255 (off)	100 (on) / 255 (off) / 512 (off) / 1500(off)	1500 (off)

FIG. 70

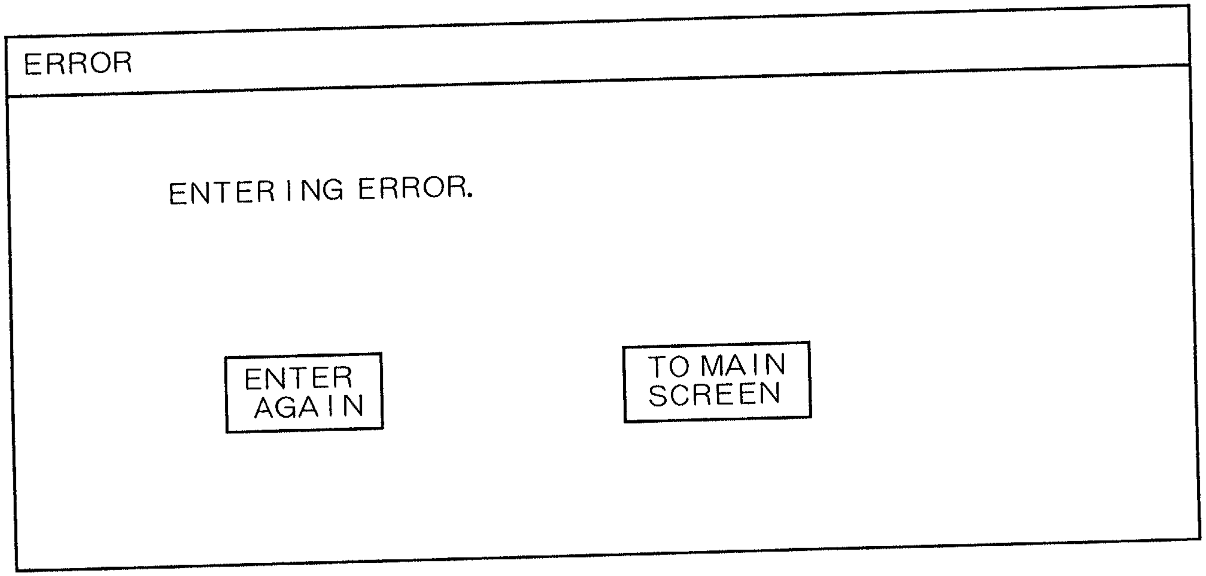


SUCCESS IN REGISTRATION

SERVICE CONTENTS IS CHANGED IN SUCCESSFULLY.

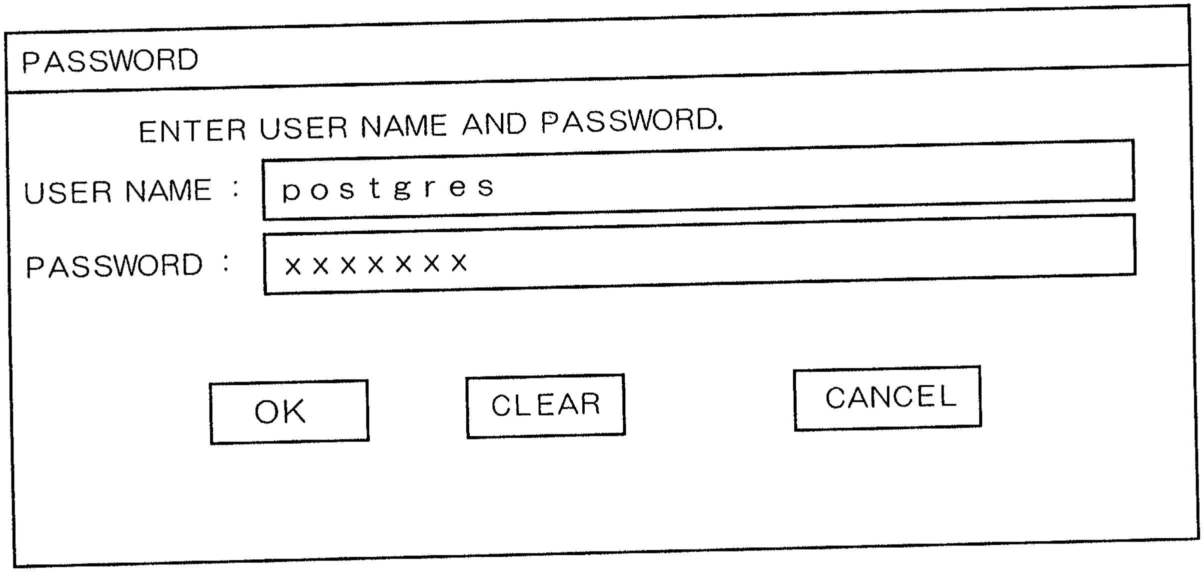
(INITIAL LOCATION REGISTERING PROCEDURE IS REQUIRED. PRESS SPECIFIC KEY BOARD.)

FIG. 71



ENTERING ERROR.

FIG. 72



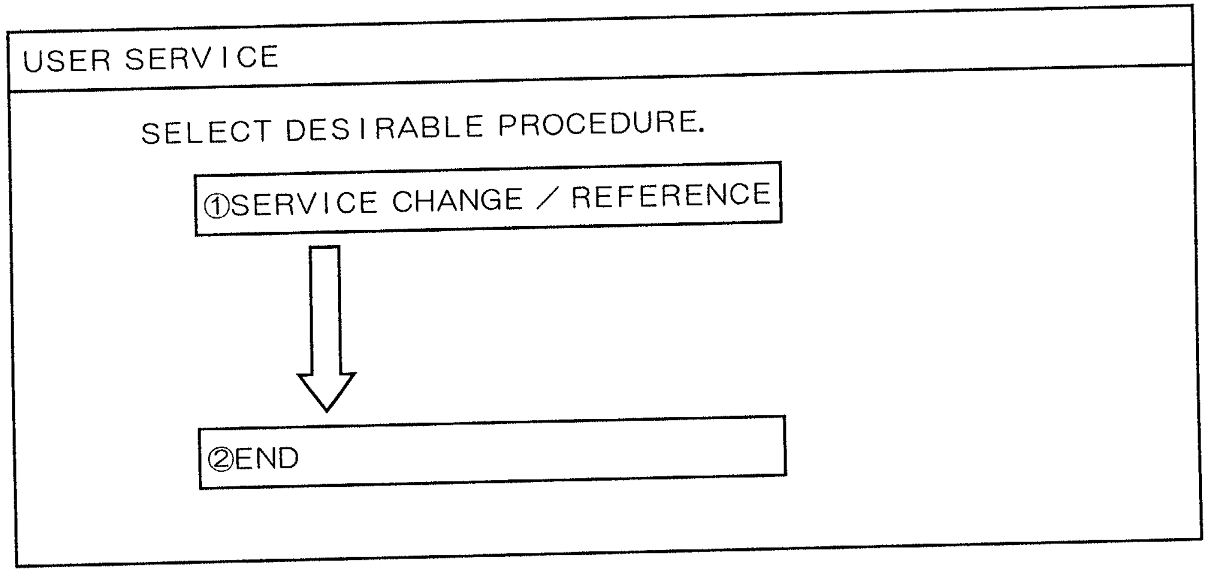
PASSWORD

ENTER USER NAME AND PASSWORD.

USER NAME : postgres

PASSWORD : xxxxxxx

FIG. 73



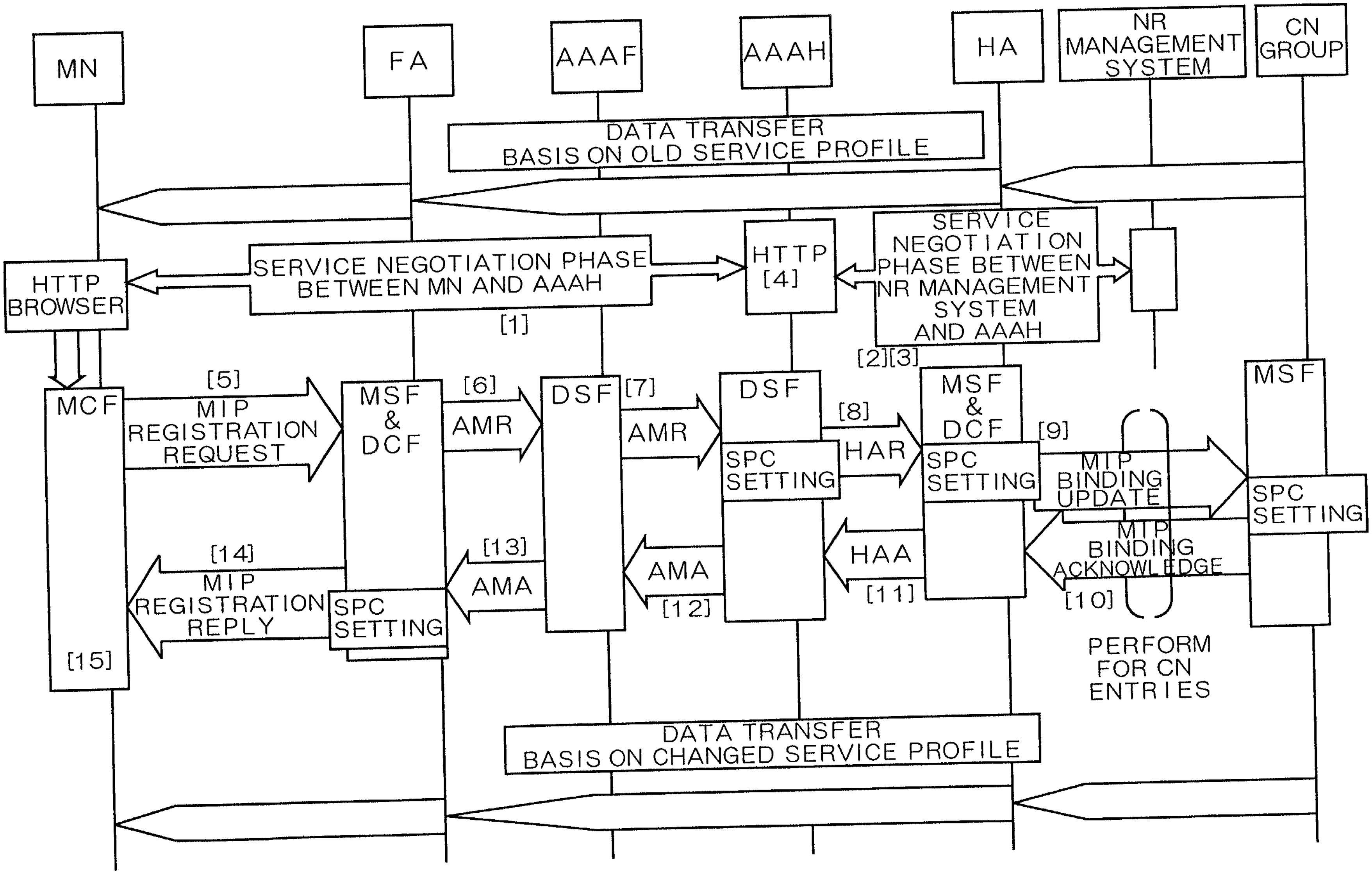
USER SERVICE

SELECT DESIRABLE PROCEDURE.

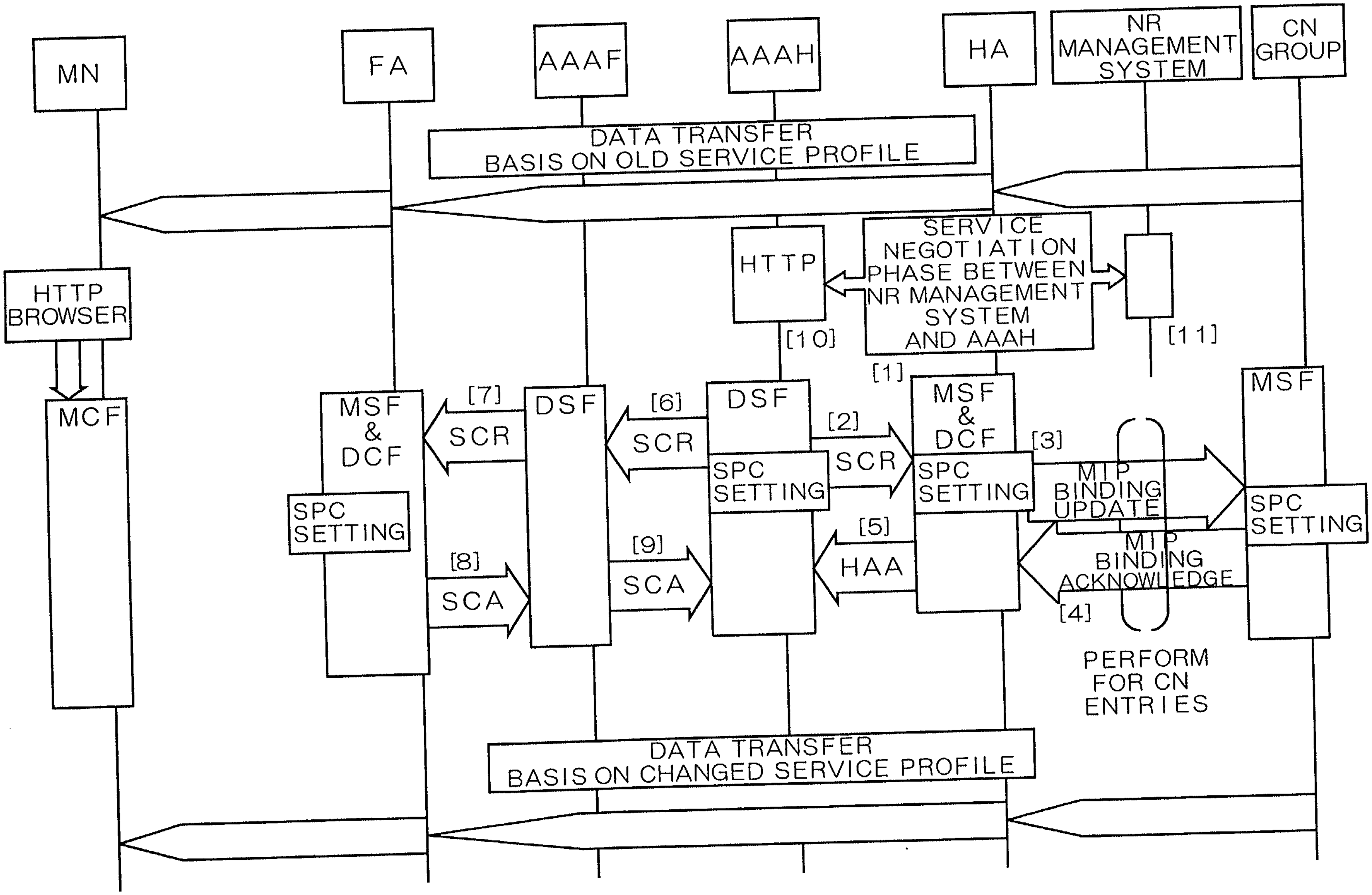
①SERVICE CHANGE / REFERENCE

②END

FIG. 74


MN
FA
AAAF
AAAH
HA
NR MANAGEMENT SYSTEM
CN GROUP
DATA TRANSFER BASIS ON OLD SERVICE PROFILE
HTTP BROWSER
SERVICE NEGOTIATION PHASE BETWEEN MN AND AAAH
[1]
HTTP [4]
SERVICE NEGOTIATION PHASE BETWEEN NR MANAGEMENT SYSTEM AND AAAH
[2][3]
MCF
[5]
MIP REGISTRATION REQUEST
MSF & DCF
[6]
AMR
DSF
[7]
AMR
DSF
SPC SETTING
[8]
HAR
MSF & DCF
SPC SETTING
[9]
MIP BINDING UPDATE
MSF
SPC SETTING
MIP BINDING ACKNOWLEDGE
[10]
PERFORM FOR CN ENTRIES
HAA
[11]
AMA
[12]
[13]
AMA
[14]
MIP REGISTRATION REPLY
SPC SETTING
[15]
DATA TRANSFER BASIS ON CHANGED SERVICE PROFILE

F/G. 75


MN
FA
AAAF
AAAH
HA
NR MANAGEMENT SYSTEM
CN GROUP
DATA TRANSFER BASIS ON OLD SERVICE PROFILE
HTTP BROWSER
MCF
HTTP
SERVICE NEGOTIATION PHASE BETWEEN NR MANAGEMENT SYSTEM AND AAAH
[10]
[11]
[1]
MSF & DCF
SPC SETTING
[7]
SCR
DSF
[6]
SCR
DSF
SPC SETTING
[2]
SCR
MSF & DCF
SPC SETTING
[3]
MIP BINDING UPDATE
MSF
SPC SETTING
[8]
SCA
[9]
SCA
[5]
HAA
MIP BINDING ACKNOWLEDGE
[4]
PERFORM FOR CN ENTRIES
DATA TRANSFER BASIS ON CHANGED SERVICE PROFILE

F/G. 76

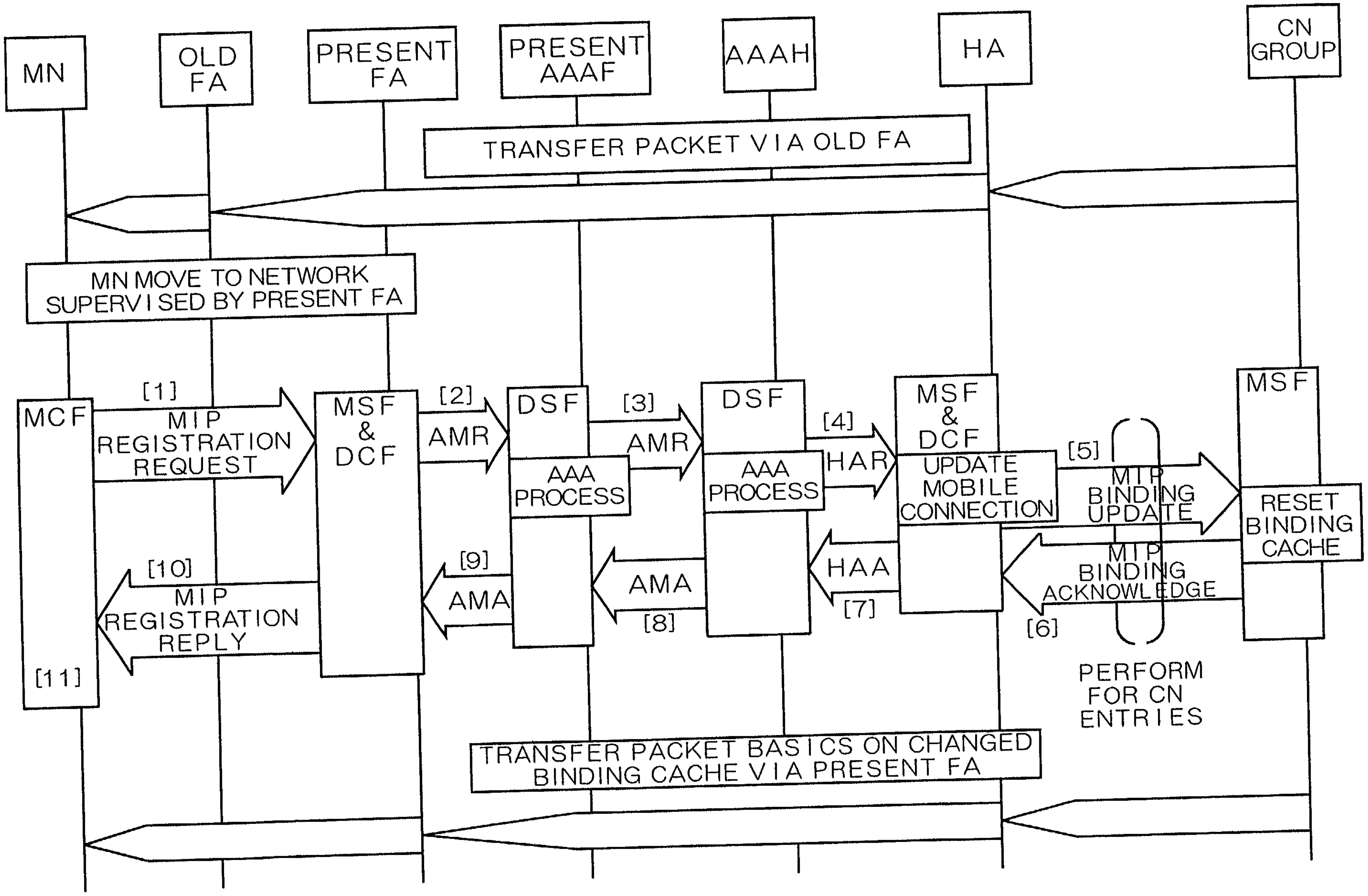

MN
OLD FA
PRESENT FA
PRESENT AAAF
AAAH
HA
CN GROUP
TRANSFER PACKET VIA OLD FA
MN MOVE TO NETWORK SUPERVISED BY PRESENT FA
MCF
[1]
MIP REGISTRATION REQUEST
MSF & DCF
[2]
AMR
DSF
AAA PROCESS
[3]
AMR
DSF
AAA PROCESS
[4]
HAR
MSF & DCF
UPDATE MOBILE CONNECTION
[5]
MIP BINDING UPDATE
MSF
RESET BINDING CACHE
MIP BINDING ACKNOWLEDGE
[6]
PERFORM FOR CN ENTRIES
HAA
[7]
AMA
[8]
[9]
AMA
[10]
MIP REGISTRATION REPLY
[11]
TRANSFER PACKET BASICS ON CHANGED BINDING CACHE VIA PRESENT FA

FIG. 77

PRIOR ART

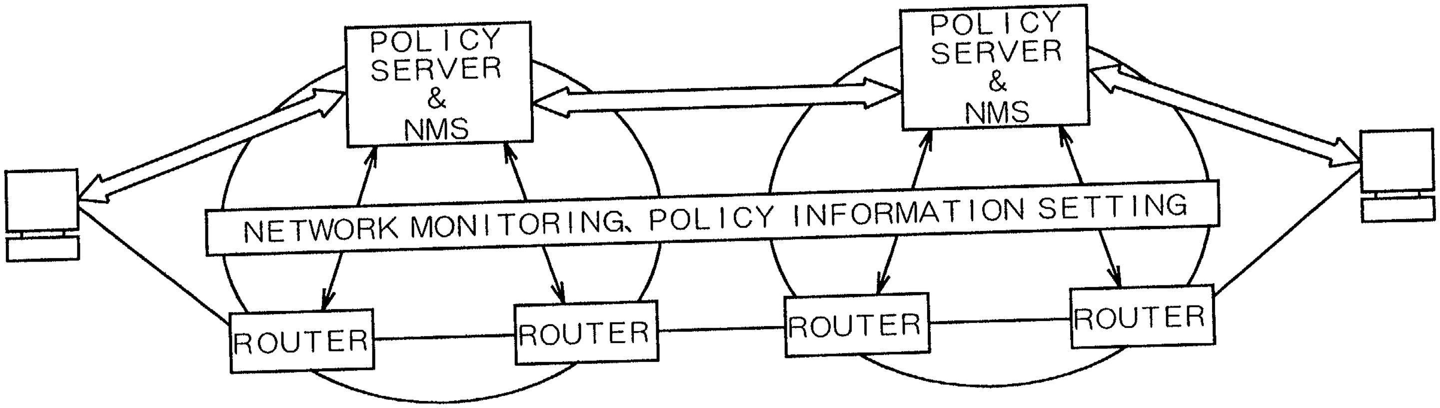


FIG. 78

PRIOR ART